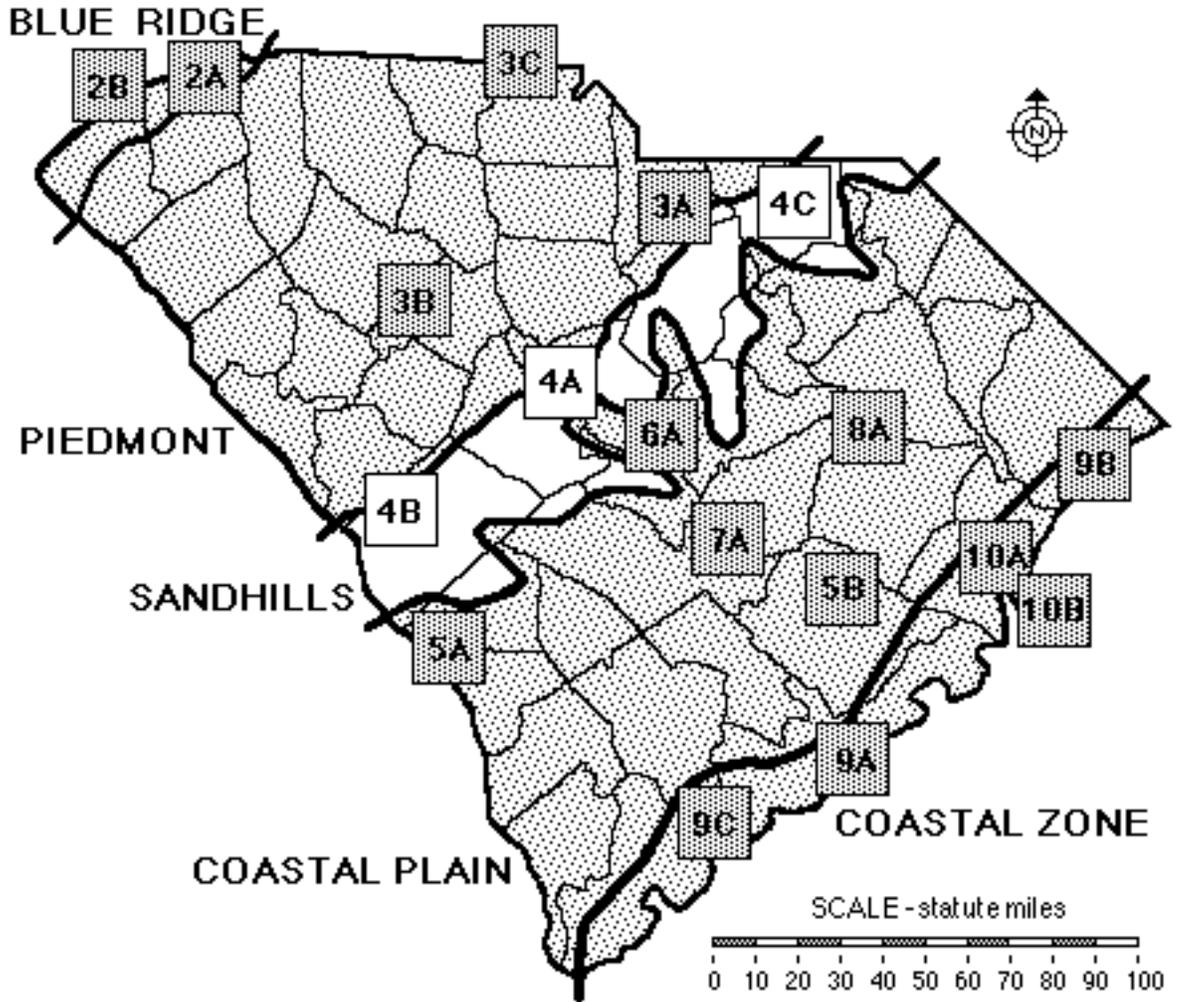


SECTION 4

SANDHILLS / MIDLANDS REGION



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(ICONS) Overv = → Sci = ⚙ Math = 🖨 Hist = 📖 Lang Arts = ✍

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(ICONS) Overv = → Sci = ⚙ Math = 🖨 Hist = 📖 Lang Arts = ✍

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- Enrichment

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(ICONS) Overv = → Sci = ⚙ Math = 📖 Hist = 📖 Lang Arts = ✍

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- p. 4C-8 6. explain choice of location for landing strip ⚙
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- Materials

- Performance Tasks

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- Enrichment

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SECTION 4

SANDHILLS / MIDLANDS REGION

POWER THINKING ACTIVITY - "Traffic Troubles"

The mayor of Columbia has decided the downtown traffic jams during morning and evening rush hour have gotten so bad that something must be done to get cars off the highways. He has hired your team as mass transit consultants to plan a system which will be convenient for people to use and will take them where they want to go.

First, look over the COLUMBIA TOPOGRAPHIC MAP and the infrared lithograph to determine the places most people work or would like to visit. Then determine areas of the city where most people live. Finally, draw lines on the map or lithograph (using wipe-off pens) representing the best routes for commuter railroad lines, bus lines, subways, trolleys, monorail, or any other types of mass transit you can think of. Draw as many routes as you think are needed and can be economically supported.

Be prepared to defend your plan at a meeting of the city council.

PERFORMANCE OBJECTIVES

1. Analyze geological processes that have sculpted the landscape of the Columbia metropolitan area and influenced historical development.
2. Examine ways Columbians harnessed the river system for transportation, as a source of water for a metropolitan area, and for hydroelectric power.
3. Recognize the Fall Line Zone running through South Carolina as an extension of the same landscape feature found all along the eastern seaboard of the United States.
4. Use geometry skills to locate the center of a geographic region.
5. Explain the naming of streets in historic districts of cities and towns and research the connections of these names to South Carolina history and folklore.
6. Identify locations of commercial granite, sand and clay quarries, explain their origins, and document uses of these natural resources and their effect on human culture.
7. Identify commercial, industrial, residential, educational, and recreational areas of urban communities and analyze placement of transportation, waste disposal, and utility systems.
8. Classify landform regions along the Fall Line Zone by comparing features on topographic maps and lithographs.
9. Use origin point and scale bar information to establish coordinate points for historic landmarks and other landscape features.
10. Analyze stories in various literary formats to explain how people coped with difficult or oppressive circumstances.

BACKGROUND INFORMATION

Description of Landforms, Drainage Patterns, and Geological Processes

Characteristic Landforms of the Sandhills / Midlands

Extending across the middle of South Carolina is a narrow, irregular band of rolling hills known as the Carolina **Sandhills**. These rounded gentle sloping hills are the remains of sandy and clayey sediment deposits left between 55 and 100 million years ago when sea level was much higher than it is today and the newly opened Atlantic Ocean covered a large portion of eastern and southern South Carolina. The sandhills **topography** corresponds to the ancient shoreline, which is recognizable today primarily by old sand dune remnants. During that ancient era, **weathering** and erosion of the **Blue Ridge** and **Piedmont** rocks and soils provided clays and sands that were carried by water and deposited at the mouth of rivers. Ocean waves and tides reshaped the sediments to form beaches and sand ridges, the remains of which are still visible today. Marine sediments were also deposited offshore, in the ancient flooded coastal plain, creating the nearly horizontal strata of sedimentary rocks that are characteristic of the present day **Coastal Plain** Region.

The Sandhills Region, covering 12% of South Carolina, runs diagonally through South Carolina in a band parallel to the Piedmont. This band includes almost all of Aiken, Barnwell, Lexington, Richland, Kershaw, and Chesterfield counties, as well as the northeast tip of Marlboro County. A very small part of the Sandhills Region also dips into Allendale, Bamberg, Orangeburg, Sumter, Lancaster, and Darlington counties. Elevation ranges from 250 to 450 feet above sea level and is almost always higher than either the adjacent Piedmont or Coastal Plain regions. The topography is generally rolling to moderately hilly, but in places local **relief** can be as much as 200 feet. The region varies in width from 5 to 30 miles, however, it is technically absent along some large river systems, such as the Congaree River in Columbia, which has cut completely through the Sandhills deposits to expose the underlying rocks.

Geographic Features of Special Interest

In more recent years, the Columbia area has been called the **Midlands** because of its central location in the state. Yet, the term "Sandhills" best describes this narrow zone running all the way across South Carolina with its characteristically sandy soil. The Midlands is more of a land use term and is generally restricted to the metropolitan area around the city of Columbia. The western portion of the Sandhills, especially Aiken County, is known for rich, white **kaolin clay** deposits, which are mined extensively. Other mining operations, such as several surface pits near Columbia, specialize in mining pure quartz sand for specialty uses.

Peachtree Rock is an unusual landscape feature located a short distance southwest of the City of Columbia near the town of Gaston. It consists of a whitish sandstone outcropping complete with fossils and internal sand dune structures. This rock has resisted erosion due to a very high percentage of quartz-rich cement that holds the rock together and imparts both strength and durability. A somewhat similar rock outcropping,

called Sugarloaf Mountain, exists in Chesterfield County near the town of Middendorf. Sugarloaf Mountain is resistant because of an iron rich cement which has permeated and bound together the original loosely held sand grains. Other areas where mature Sandhills ecosystems can be observed include the Sandhills National Wildlife Refuge in Chesterfield County, and the Fort Jackson Army Base in Richland County.

Fall Line Zone

The **Fall Line Zone** can be roughly defined as the boundary between the Piedmont and the Coastal Plain. It is easily located along river valleys by documenting the first occurrence of **rapids** upstream from the ocean. The more resistant rocks of the Piedmont Region and the less resistant rocks of the Coastal Plain Region do not erode at equal rates. As a result, the river channel in the Coastal Plain Region is always slightly lower in elevation than the channel in the Piedmont, forming telltale rapids. The importance to commerce of the Fall Line Zone is confirmed by the large number of major cities located along the roughly defined boundary, including North Augusta, Columbia, Camden, and Cheraw. Even beyond South Carolina the Fall Line Zone is historically important. The list of state capitals located along this line includes Providence, Rhode Island; Hartford, Connecticut; Trenton, New Jersey; Richmond, Virginia; Raleigh, North Carolina; Columbia, South Carolina; and Montgomery, Alabama. Several other major cities are also located along this boundary.

Figure 4-1: Map of Fall Line Zone



Rivers begin to take on a much different character once they flow past the Fall Line Zone. Broad meanders, extensive **floodplains**, **oxbow lakes**, and **swamp**-like vegetation contrast with the straight channeled, narrow erosional valleys characteristic of the Piedmont. It is very difficult to trace the actual Fall Line between river valleys in South Carolina because of the locally extensive and elevated Sandhills Region. Throughout much of the state, the Sandhills act as a drainage divide preventing Piedmont streams from crossing into the Coastal Plain. The only exceptions are large, powerful rivers such as the Savannah, Congaree, Wateree, Lynches, and Pee Dee.

Sandhills Soils

Coastal Plain soils increase in age with distance from the ocean because soils cannot start forming until sea level has fallen sufficiently to expose the former ocean floor to surface weathering conditions. The soils of the Carolina Sandhills, then, are among the oldest in the Coastal Plain of South Carolina. Such extensive weathering, over a period of perhaps a million years or more, has removed much of the original nutrient content of the soil. Unfortunately, the original sandy material was notoriously low in nutrients and organic material to start with, meaning that almost all soil fertility has been lost and the only material left is the original quartz mineral grains, which are highly resistant to weathering. Some clay does occur, however, usually in thin horizons of red or pink sandy clay. Clay rich soil can present its own problems for agriculture, though, especially during long dry spells when the clay can bake dry into a brick-like hardpan. Overall, there is far less clay in Sandhills soils than in the Piedmont because of the different nature of the parent material.

The rolling nature of the topography and the sandy parent material combine to permit good surface and internal drainage so that the majority of soils here are very well drained, sometimes too well drained to hold sufficient moisture for typical agricultural use. Because the soil texture allows for rapid leaching, soils are also strongly acidic. It is not uncommon to find lenses or horizons in Sandhills soils where sand grains have been cemented together with iron oxides, forming a barrier to root growth and water movement. **Alluvial** soils are rare in the Sandhills Region, but where they occur, they are rich and productive.

Influence of Topography on Historical Events and Cultural Trends

Landforms Influenced the Development of Cities

The present landscape, shaped by geological processes that took place millions of years ago, as well as by much more recent stream erosion, has clearly shaped past and present land use in the Sandhills/Midlands Region. When early settlers first began to make an imprint on the land, there were many good reasons for developing cities along the banks of major waterways that crossed the Fall Line Zone. The placement of structures such as cotton mills, railroad centers, and canals along the banks of these river systems was not just by chance. Mills needed water power to run machinery, and canals provided transportation around rapids, rendering the unloading and reloading of boats unnecessary. Any persons or products traveling by boat would have to disembark or be unloaded to detour around the falls or rapids associated with the Fall Line Zone. Railroad centers developed as a means of distributing goods from the boats to the upstate. Many state capitals, including South Carolina's, developed at Fall Line Zone locations along major river systems.

Choosing a Site for the New Capital

By 1785, bowing to increased pressure from the **Up Country**, the South Carolina Legislature decided to move the state's capital inland from Charleston. This process began officially on the 27th of January, 1785, when a petition from the inhabitants of the area between the Broad and Catawba rivers was presented to the South Carolina House of Representatives which read in part:

Therefore your petitioners humbly pray, that the seat of government may be fixed as central as possible for the ease and convenience of the community at large . . .

Following the request of this petition and numerous other similar ones, the General Assembly spent a year investigating the possibility of moving the capital of the new state to a more central location. Finally, on March 14, 1786, the Representatives accepted the report of the committee appointed to locate (as near as they could ascertain) the center of the state in order that the seat of government be moved there. Their conclusion was:

. . . that they have been very assiduous to accomplish the business they had in charge, that they examined and compared all the different maps of the state which they could possess themselves of, and are of opinion that the center of the state is included in the circle whose circumference strikes through the high hills of Santee crosses Santee at the confluence of Congaree and Wateree rivers and crosses the Congaree River at the confluence of the Saludy & Broad River and diameter of which circle is thirty miles . . .

Senator John Lewis Gervais had introduced a bill on March 6, 1786, to officially move the capital from Charleston to the center of the state. The exact location of the future capital was hotly debated; however, Senator Gervais and Representative Henry Pendleton finally carried the day with their suggestion of a site near Friday's Ferry on the Congaree River which included the plain of a hill then owned by Thomas and James Taylor. The Congaree River had always provided transportation to the Up Country, up to the rapids at the junction of the Broad and Saluda rivers. This location had proven to be a natural spot for a trading center as early as 1718 and the town of Granby had developed on the western shore of the Congaree River by 1748.

As part of an attempt to ridicule the Up Country wilderness settlers, Charlestonians suggested that the site be called, "Town of Refuge," but Gervais responded that he "hoped that the oppressed of every land might find a refuge under the wings of Columbia." The name Columbia* finally prevailed, winning over its rival name, Washington, which had been suggested as a way to honor George Washington, by an 11-7 vote in the Senate. The General Assembly met in Columbia for the first time in January 1790, in a temporary wooden State House. During the writing of the State Constitution of 1790, Charles C. Pinckney tried to have the capital moved back to Charleston; however, this attempt was defeated by a vote of 109-105, and Columbia became the permanent capital.

Laying Out the City of Columbia

The Senate bill introduced by Gervais, on March 6, 1786, also authorized the Assembly to elect commissioners who would lay off 650 acres of land in lots of one-half acres near Friday's Ferry on the land of James and Thomas Taylor. The House then proceeded to the second reading of Senator Gervais' bill to "appoint commissioners to purchase land for the purpose of building a town," and another debate ensued. The House added a stipulation which made the streets no less than sixty feet wide. Proposed on March 14, 1786 by Dr. John Budd of Charleston, the wide streets were thought to be of benefit in preventing the spread of diseases and fires, and were a wise precaution for a city situated in a warm climate. Dr. Budd also stated that no one could predict the future volume of street traffic, and wide streets would more easily accommodate such growth. Two other changes by the House placed the site of the new town "within two miles of the confluence of the Broad and Saludy (Saluda) rivers" and two miles square in place of 650 acres on Taylors Hill. The bill passed by a vote of 65 to 61.

The final bill, ratified on March 22, 1786, read that the commissioners were:

. . . authorized to and required to lay off a tract of land two miles square, near Friday's Ferry, on the Congaree river, including the plain of the hill whereon Thomas and James Taylor, Esquires, now reside, into lots of half an acre each, and the streets shall be of such dimensions, not less than 60 feet wide, as they shall think convenient and necessary, with two principal streets, running through the centre of town at right angles of one hundred and fifty feet wide; which said land shall be, and the same is declared to be, vested in said commissioners, and their lawful successors for the use of this state.

*Columbia is a derivation of the Columbiad or having to do with Christopher Columbus, discoverer of America, which became a refuge for people fleeing persecution.

The Columbia Canal and Water Transportation

The War of 1812 demonstrated to American leaders the inadequacy of the nation's internal transportation system. John C. Calhoun, of South Carolina, strongly supported Henry Clay in his political drive to provide federally-funded internal improvements. But even after the economic success of the Erie Canal launched the Canal Age, it was the states and not the federal government who funded most of these internal improvements. South Carolina was no exception. In 1818, South Carolina committed the equivalent of \$1,900,000 toward improvement programs. One major project was the Columbia Canal which was begun in 1819 and completed in 1824. The canal was needed to overcome a total river fall of 34 feet. This drop in topography created rapids beginning two miles above the city and ending one mile below. The Columbia Canal was originally 3 1/8 miles long, beginning in the area between Lumber and Richland streets and ending across from Granby's Landing.

However, the Canal Age was short-lived. The growth of railroads soon made water transportation and the canal system obsolete. Although no longer a water trade route, the Columbia Canal eventually became used as a source of hydroelectricity. In 1891, the original canal was enlarged and extended several miles northward to increase its power-generating capacity. In 1893, the Columbia Mills Company selected a site beside the canal on Gervais Street to locate their duck cloth (coarse cotton) manufacturing plant. The powerhouse constructed at the canal supplied power for 14 alternating-current motors within the mill. Manufacturing at the world's first electrically operated mill began on June 11, 1895. The Columbia Mill later became Mt. Vernon Mill and is now the site of the South Carolina State Museum. The power plant built at the base of the Columbia Canal has generated electricity to make gun powder, run a grist mill, operate a state dispensary, pump water for Columbia, and even drive a saw mill. It has been in continuous operation since the 1890's providing electricity for Columbia. The plant is currently operated by the South Carolina Electric and Gas Company.

During the Great Depression of the 1930's, the Federal Writers Project interviewed former slaves about their occupations and lifestyle under slavery. The following account of transporting cotton to market by water was made by Alexander Scaife in Pacolet, South Carolina.

The Cotton Boat

Excerpt from Hurmence, Belinda. *Before Freedom, When I Can Just Remember*

It took a week to take the cotton boat from Chester to Columbia. Six slaves handled the flatboat: the boatman, two oarsmen, two steersmen, and an extra man. The steersmen was just behind the boatman. They steered with long poles on the way up the river and paddled down the river. Two oarsman was behind them. They used to pole, too, going up, and paddle down.

Seventy-five or eighty bales was carried at a time. They weighed around three hundred pounds apiece. In Columbia, the wharfs was on the Congaree banks. For the cotton, we got all kinds of supplies to carry home. The boat was loaded with sugar and coffee coming back. On the Broad River, we passed by Woods Ferry, Fish Dam Ferry, Henderson's Ferry, Henderson's Island, and some others, that is all I recollect. We unloaded at our town ferry called Scaife Ferry.

The Secession Convention and the Onset of the Civil War

On December 17, 1860, the Secession Convention met in Columbia at the newly constructed First Baptist Church on Hampton Street between Sumter and Marion Streets. Before adjournment, the most "ablest and dignified body of men" declared their intention to withdraw from the Union. Because of a case of smallpox, the convention was moved to Charleston, where on December 20, 1860, they voted unanimously to secede making South Carolina the very first state to withdraw from the Union. When the news arrived in Columbia and other parts of the state, celebrations were held by hoisting palmetto flags, ringing church bells, firing cannons, lighting bonfires, and holding parades. On February 4, 1861, the Confederate States of America was created. Seven southern states left the Union. The War began April 12, 1861, when Confederate troops fired on Fort Sumter. Four more states seceded from the Union after the war began.

Columbia's Importance to the Confederacy

Columbia remained outside the war zone for almost the entire duration of the Civil War. Nevertheless, a military atmosphere pervaded the town because of its training academy, prisoner of war camps, Confederate offices, and army hospitals. The population of Columbia had soared from 8,000 to 20,000 during the War years, as many refugees came from Charleston and Georgia to find work. Goods manufactured in the Midlands for the Confederate Army included cannon balls, swords, bayonets, silver-plated copper buttons, wool hats, leather shoes, tents, knapsacks, socks, yarn and medicines. Confederate notes and bonds were printed in Columbia after the minting operation was moved from Richmond, Virginia. The building is still standing today at the northeast corner of Gervais and Huger Streets. In addition, the city became a safe depository for many public and private artifacts. Items such as the bells of St. Michael's church in Charleston, rare books from the Charleston Library, silver plated items, valuable papers, and bank funds were all sent to Columbia for safe keeping. Valuable possessions were sent from as far away as Georgia. Even large quantities of whisky had been shipped to Columbia by the Charleston merchants for safe storage.

Sherman's March Through South Carolina

Toward the close of the Civil War, Union General William T. Sherman made his infamous march through the South. As Sherman and his troops crossed South Carolina, they pillaged and destroyed mansions, homes, barns, fields, and forests. It was reported that huge columns of smoke and burnt chimneys marked his sixty mile wide path. When Sherman left Savannah, GA, most South Carolinians thought he would strike Charleston. Consequently, many citizens left Charleston for Columbia or sent their goods there for security reasons. Not until Sherman left Orangeburg in partial ruins on February 13th and turned his 20,000 troops and 250 wagons toward Columbia did most citizens realize that this city was his next target. By then all of the railway lines had been destroyed and there was no communication possible except by word of mouth. As he approached Columbia, the Congaree River Bridge was burned. The following excerpt is taken from Sherman's personal diary.

Early next morning (February 16) the head of the column reached the bank of the Congaree opposite Columbia, but too late to save the fine bridge which spanned the river at that point. It was burned by the enemy. While waiting for the pontoons to come to the front, we could see people running about the streets of Columbia occasionally small bodies of cavalry, but no masses. A single gun of Captain De Gress' battery was firing at their cavalry squads, but I checked the firing, limiting him to a few shots at the unfinished state house walls, and a few shells at the railroad depot to scatter the people who were seen carrying away sacks of corn and meal that we needed. There was no white flag or manifestation of surrender.

In Sherman's diary the enemy he referred to was a group of South Carolinians defending their city. Today, six brass star markers on the South Carolina State House facade indicate the damage to the structure done by Captain De Gress' twenty-pound Parrot cannons in 1865. The shells were fired across the Congaree River from what is now West Columbia. The Congaree River at that time was too broad and swift for a safe crossing; Sherman ordered his troops to go north and cross the Saluda and Broad rivers, which were less treacherous. It is also reported that Sherman and his troops spent the night on an island close to the present site of the Riverbanks Zoo. Articles written by Henry A. Rogers, describe Sherman's stay in Columbia:

On February 17 Sherman and his men entered Columbia and remained there three days destroying the great beauty of many fine town houses and public buildings. Controversy still reigns as to whether Sherman gave the order for the city to be burned or whether drunken soldiers did it out of wantonness of spirit. Nevertheless, the once magnificent and proud capital city of the first state to secede from the Union stood in ashes and shambles when the Union army departed on February 20.

The Fall of Columbia

Advised by Confederate General Wade Hampton, III, to surrender the city of Columbia, Mayor Thomas J. Goodwyn sent a message to General Sherman at 9:30 a.m. on the morning of February 17, 1865. At 10:00 a.m., Confederate General Beauregard and his staff rode northward out of Columbia. At the same time Mayor Goodwyn, riding in a carriage that bore a white flag, proceeded down Broad River Road to meet Sherman as he crossed the river. By 11 a.m., General Sherman, flanked by three of his generals, and leading the Fifteenth Corps, crossed the Broad River near the Saluda factory on a pontoon bridge and entered the city of Columbia. Lingered behind his troops at Main Street and Elmwood Avenue, Confederate General Wade Hampton looked northward until he saw the mayor in his carriage carrying the white flag of surrender. The mayor was flanked by columns of Federal troops, approaching Columbia. Hampton then turned, with a feeling of sadness and false sense of assurance that the capital city of South Carolina was safe and secure, to ride eastward to join the Confederate troops as they rode out of Columbia. It was just before noon when the Federal troops began marching toward the Capitol on Main Street. Most of these troops bivouacked around the outskirts of Columbia, while General Sherman was escorted to the Duncan Blanton home on Senate Street.

As the Federal troops entered the city, whisky stores were reportedly broken into and kegs were opened on the streets. Plundering by both citizens and soldiers became rampant. General Hampton's Millwood and Sandhills homes were burned along with many other dwellings owned by prominent citizens. By sundown, fires began breaking out all over Columbia. A strong wind was whipping up a dust storm out of the northwest.

In addition, pieces of cotton from broken bales blew like a snowstorm covering trees and shrubbery. Flames spread like a prairie fire over the downtown area of Columbia. Panic followed as buildings were engulfed in a holocaust. The streets of Columbia had turned into chaos. Of the 124 city blocks then occupied, 84 were burned to the ground.

One Account of the Burning of Columbia

Traditional

Sherman's troops entered the city of Columbia on February 17. During the night a fire swept through the city and burned 84 of its 114 blocks. I've heard tales all my life about the night the city turned to fire - - some accurate according to the historians, some fictionalized by the survivors and the storytellers. This is just one. You decide.

The day was filled with the necessary preparations anyone can take for impending disaster. Guns cleaned, silver hidden from enemy eyes. The men met, and the women prayed. A group of worshippers congregated at the First Baptist Church on Hampton Street, between Sumter and Marion Streets. Too innocent to imagine the worst, they sat solemnly in the pews and asked God Almighty to protect them from Sherman and his men. But, not every Christian waited for the Lord to do all the work. The custodian stationed himself outside the walls of sanctuary, and there he promised to stand against the on-coming enemy.

No one could have envisioned the devastation of fire balls blazing and the sound of guns echoing in the abandoned streets. No one. Not even the stoic figure who stood alone to face the enemy. Finally his opportunity came. A soldier approached him, and ordered him to name the place he guarded. Without so much as a hesitation, the man said, "Sir, this is the house of my Methodist brothers." The soldier questioned him again, asking for the location of the First Baptist church, known to be the regular meeting place of the secession convention. This single saint replied, "Why, sir, that would be the spire you see down the street, that way." With that the soldier turned and ordered those who had gathered around him to march on.

That night many prayers were offered to the Lord including the one of the guilt-ridden hero who had sent the army to burn down the Washington Street Methodist Church at the corner of Washington and Marion Streets.

To this day, the First Baptist Church is standing as a historic reminder of 18th Century architecture - illustrating columns, brickwork and interior decoration of the period.

A first hand account of Sherman's troops in Columbia is described vividly in a diary kept by Emma LeConte, the seventeen year old daughter of Joseph LeConte who was the chemistry professor at South Carolina College. The college campus, which had been turned into a hospital, was not torched or pillaged. Neither was their campus residence. She imparts a civilian's insight into the war years and conveys a graphic picture of the characteristic social structure and attitudes of the South's upper class.

Eyewitness Account of the Burning of Columbia

Diary of Emma LeConte, February, 1865

Entry for February 17, 1865

At about six o'clock, while it was still quite dark and all in the room were buried in profound slumber, we were suddenly awakened by a terrific explosion. The house shook-broken windowpanes clattered down, and we all sat up in bed, for a few seconds mute with terror. My first impression on waking was that a shell had struck the house, but as soon as I could collect my senses I knew that no shell could make such a noise What ever the cause, the effect was to scare us very effectively and to drive away all thoughts of sleep After breakfast the cannon opened again and so near that every report shook the house The negroes all went uptown to see what they could get in general pillage, for all the shops had been opened and provisions were scattered in all directions. Henry says that in some part of Main Street corn and flour and sugar cover the ground...the negroes are very kind and faithful. They have supplied us with meat and Jane brought Mother some rice and crushed sugar for Carrie A gentleman told us just now that the Mayor had gone forward to surrender the town.

One o'clock p.m.

Well they are here. I was sitting in the back parlor when I heard the shouting of the troops. I was at the front door in a moment, Jane came running and crying, 'Oh, Miss Emma, they've come at last!' She said they were then marching down Main Street, before them flying a panic-stricken crowd of women and children who seemed crazy. I ran upstairs to my bedroom just in time to see the US. flag run up over the State House.

Later

General Sherman has assured the Mayor that he and all the citizens may sleep as securely and quietly tonight as if under Confederate rule. Private property shall be carefully respected. Some public buildings have to be destroyed, but he will wait until tomorrow when the wind shall have entirely subsided . . .

Entry for February 18, 1865 (Written on February 18th about February 17th)

At about seven o'clock pm I was standing on the back piazza in the third story. Before me the whole southern horizon was lit up by camp fires which dotted the woods. On one side the sky was illuminated by the burning of Gen. Hampton's residence a few miles off in the country, on the other side some blazing buildings near the river The fire on Main Street was now raging, and we anxiously watched its progress from the upper front windows. In a little while, however, the flames broke forth in every direction. The drunken devils roamed about, setting fire to every house The firemen attempted to use their engines, but the hose was cut to pieces and their lives threatened. The wind blew a fearful gale, wafting the flames from house to house with frightful rapidity. By midnight the whole town (except the out-skirts) was wrapped in huge blaze.

Preservation of Historic Homes

Hampton-Preston Mansion

Another message received by Sherman on Friday morning, February 17, 1885, was a plea for protection from the Mother Superior of Ursuline Convent. In requesting special protection for the convent school and its girls, she informed Sherman that she had formerly taught at the school in Ohio where his daughter, Minnie, was a student. Sherman sent word to her that "we contemplate no destruction of any private property in Columbia." However, during the holocaust which followed, Ursuline Convent at the southeast corner of Main and Blanding Streets was destroyed. The nuns and their pupils fled to St. Peter's Catholic Cemetery on the southwest corner of Assembly and Taylor Streets, where they escaped the heat of the flames as they huddled by the tombstones on that cold winter night. On Saturday, February 18th, the Mother Superior of Ursuline Convent made a second plea to General Sherman, this time for shelter and protection. He replied that they could stay in any home they wanted. She selected John S. Preston's (brother-in-law to Wade Hampton) home, which was built in 1818 for Ainsley Hall and his wife. Upon Hall's death in 1823, the house was purchased by Wade Hampton I, and became the townhouse for three generations of Wade Hamptons. Today it is known as the Hampton-Preston Mansion. As Sherman's troops left Columbia, the nuns and their pupils moved into this spacious **antebellum** house. They found the rooms inside the mansion in shambles and learned that the troops had planned to burn this mansion as they left Columbia. Thus the Mother Superior of Ursuline Convent is credited with saving this magnificent home from a devastating fire. Facing Blanding Avenue, the mansion sits on a four acre block bounded by Pickens, Laurel, and Henderson Streets. Today, the Hampton-Preston Mansion is held in public trust by the Richland County Historical Preservation Commission and open to the public for tours.

Robert Mills House

Another historic antebellum house that escaped the fires was the Robert Mills House on Blanding Avenue. It is situated on a four acre block bounded by Blanding, Pickens, Taylor, and Henderson Streets and faces the Hampton-Preston Mansion. During Sherman's occupation of Columbia, the Robert Mills House was the Presbyterian Theological Seminary. Consequently, it was spared from destruction. The house takes its name from the famous federal architect Robert Mills, who designed the Washington Monument, the United States Treasury Building, and the Old Patent Office Building in Washington, DC. Columbia can boast of another Robert Mills building. Located on the South Carolina State Hospital grounds at Elmwood Avenue and Bull Street, the second Mills House served as a hospital during Sherman's invasion and therefore was spared from the fires. Both of these buildings have been restored to their original beauty and serve as a showcase for the architecture of the period.

Mann-Simons Cottage

Celia Mann was a slave in Charleston who purchased her freedom with money she earned as a midwife. Prior to the Civil War, she walked to Columbia and bought a cottage located on the northeast corner of Richland and Marion streets. She was residing there when Sherman marched through South Carolina, and the house was not burned. She lived to see the war end, but died a few years afterwards. Her family maintained ownership of the cottage until a grand niece sold it to the Columbia Housing Authority in 1970, under the condition that the house would be preserved and its history passed on to others. Today it is known as the Mann-Simons Cottage, is fully restored, and serves as a Museum for African American Culture.

Blanding Street House

Some ingenious ways were devised to preserve personal property as well as buildings. The owner of a bob-tailed horse, John A. Crawford, Esq., appreciated his horse highly. Although not a race horse, if any one attempted to pass this animal on the road, it would step out in a way that showed it could get over ground in a hurry. Realizing that Sherman's men were approaching, Crawford muffled his horse's hoofs and led the animal up the stairs to the second story of his dwelling, thereby foiling possible theft by robbers. The house still stands today on the southeast corner of Blanding and Bull streets.

After leaving Columbia, Sherman and his troops went to Winnsborough (Winnsboro) in Fairfield County, crossed the Wateree River at Rocky Mount in Chester County, and marched on toward Cheraw and then Bennettsville. By the time they crossed into North Carolina, the Federal troops under Sherman's command had destroyed and pillaged a sixty mile wide path all the way across the South Carolina.

Climate and Water Resources

The Sandhills Region has a 200 to 240-day growing season and receives an annual rainfall of about 44 inches. It is usually considered to be the hottest region in the state and can become quite humid during hot summer days. It is far away from the cooling breezes of the coast and equally far from cooler mountain elevations. There are very few large lakes, ponds, or other bodies of water to moderate the regional temperature. Most streams which originate in this area are intermittent, flowing only during periods of heavy rainfall. The extremely high **porosity** of the soil combines with the generally high elevation to produce ground water levels which lie fairly deep below the land surface. Surface water tends to sink rapidly into the soil.

Agriculture and Forestry

The Sandhills Region is generally not a very productive agricultural area because of rapid loss of nutrients, organic materials, and water from the soil. The loose sandy texture of the soil makes it almost impossible to retain moisture near the surface. The area is well suited for longleaf pine and turkey oak forests, and similar vegetation which easily adapts to water-starved conditions. Only eight percent of the soils in this region are classified as prime farmland. About two-thirds of the area is forested, and one-third is planted in crops or pasture. With proper management, truck crops and peaches can be grown successfully.

Carolina Sandhills National Wildlife Refuge

The Carolina Sandhills National Wildlife Refuge consists of approximately 46,000 acres of land and water in Chesterfield County. Most of the refuge is covered by longleaf pine forests interspersed with scrub oak. The **habitat** is enhanced by 1,200 acres of open fields and forest clearings, and thirty man-made lakes and ponds. The refuge was purchased in 1939 under the provisions of the Resettlement Act. The land had become badly eroded and very little wildlife was left in the area. The immediate goal of the refuge was to restore the damaged barren land to a rich, healthy environment so native plants and animals could re-establish themselves.

The primary objective of the refuge today is to provide habitat and protection for threatened and endangered species, as well as migratory birds. Some of the animals on these lists include the red-cockaded woodpecker, pine-barrens treefrog, southern bald eagle, and the eastern cougar. The refuge also offers opportunities for environmental education, wildlife oriented recreation, and serves as a demonstration area for land management practices, which help preserve our wildlife heritage and conserve precious natural resources.

The refuge conducts a variety of habitat management programs to increase and maintain habitat diversity for wildlife. Examples include prescribed burning, roller chopping, mowing, and periodic timber harvesting. Also, pond water levels are changed with each season to encourage the growth of desirable aquatic vegetation and control the growth of submerged vegetation which would eventually clog the waters completely. Fields and clearings provide food and cover for many species of wildlife. These areas

are planted with crops favored by deer, turkey, dove, and quail. Open areas are essential to achieve the natural diversity characteristic of the original Sandhills habitat.

Unique Natural Habitats in the Sandhills

The Sandhills Region displays a unique assemblage of vegetation, classified as **xerophytic**, or adapted to dry conditions. The dryness of the area is related to the extremely rapid drainage through the predominantly sandy soils. Xerophytic vegetation is distinguished by a short broken canopy, a dispersed distribution of plants, and in some cases, wide expanses of bare soil. The predominant forest cover consists of longleaf pine and turkey oak, the latter usually in a stunted form. Over time, large areas have been burned, cleared, and cultivated. Now much of the area is planted in loblolly or slash pine, neither of which is native to the area. A number of shrubs and herbaceous plants, including species of sparkleberry, wild rosemary, gopherweed, and sand myrtle, are distinctive elements of the region's vegetation. Also, the Sandhills are home to the endangered red-cockaded woodpecker and the gopher tortoise. These animals require special habitat conditions for their continued survival.

Clay Deposits

In the western part of the Sandhills Region, particularly in Aiken County, large deposits of kaolin clay have been mined extensively. Aiken County ranks second nationally in the production of all types of kaolin. This clay is of great economic importance in South Carolina and is used unprocessed in the manufacture of ceramics and refractory materials and in its processed form in such diverse materials as rubber, paint, paper, fertilizer, and pesticides. Many millions of years ago, abundant feldspar mineral grains in exposed granite landscapes were altered to the mineral kaolinite through chemical weathering processes. The loosened grains were transported by water and deposited as thick layers, which were then buried by other sedimentary deposits and turned into rock. Modern erosion has uncovered the clay deposits, providing easy access for today's mining activities.

The Pottery Industry

In addition to pure kaolin, South Carolina colonists discovered other large deposits of fine clay as they moved west from the coast. These valuable deposits provided the materials necessary to make the pottery vessels which were vital for transporting and storing liquids before glass and plastic became readily available. The best deposits were located near Edgefield, Camden, and Columbia. The Carolina Colony, and later the state of South Carolina, exported tons of the kaolin to England, most notably to the Wedgwood factory in England. However, a large number of South Carolinians, including Francis Pickens, established their own local pottery works.

Edgefield County at one time contained two-thirds of the state's pottery works. The first one of significance, built between 1810 and 1820, had the artisan village of Pottersville develop around it. By 1825, sixteen houses, a few stores, and a newspaper constituted this manufacturing center one and a half miles from the Edgefield County Court House. Later, other pottery works also developed in the Edgefield area.

All of these works utilized African American labor, both slave and free. Although in Africa, women were responsible for making all the pottery, South Carolinians followed the

British tradition, and men alone created the stoneware. One slave, known only as Dave, became the most famous and accomplished potter in the South. Dave, who lived to the ripe old age of eighty-three, made large pots wide in the shoulders, the largest having a capacity of forty gallons. Dave inscribed the necks of many jars that he made with verses such as:

"This jar is made cross / If you don't repent you may be lost."

"The Fourth of July is surely come / to sound the fife and beat the drum."

"I wonder where is all my relation / Friendship to all and every nation."

"Dave belongs to Mr. Miles / Where the oven bakes and the pot biles."

Some historians believe that Dave's verses contained hidden messages that slaves would understand but others would not recognize. Others see these verses as simply clever sayings meant to increase the value of the pots.

Summary

The Sandhills of South Carolina preserve the ancient shoreline deposits of the Atlantic Ocean during a time when sea level was much higher than it is today. Some call this part of the state the Midlands, because this area lies both near the center of the state and roughly midway between the current location of the coast to the east and the mountains of the Blue Ridge to the west, but the term Sandhills is more descriptive of the topography and geologic makeup of this narrow band of ancient sand dunes. The unique character of the Sandhills greatly influenced the historical development of this area.

In contrast to the pattern that holds true in most of South Carolina, the Sandhills were not settled primarily by farmers. Due to the inability of Sandhills soils to hold water, only a small percentage of this region is considered good for farmland even with modern practices. In the 1700's, it was nearly worthless from an agricultural point of view. In fact, George Washington, after passing through the Sandhills from Augusta to Columbia, remarked that the land was probably the poorest that he had ever seen. This region is by no means a desert, but the native plants are adapted for quick use of the abundant but periodic rain water in ways which most agricultural crops are not.

The rapids that occur on the major rivers that cross from the Piedmont, through the Sandhills, to the Coastal Plain below encouraged settlement for two reasons: 1) they formed the upward limit of navigability for boats heading inland from coastal ports, and 2) they served as excellent sites for the production of hydropower for textile mills and other industry. These rapids, along the boundary between the harder rocks of the Piedmont and the generally softer rocks of the Coastal Plain, pinpoint the Fall Line Zone, which extends not only through South Carolina but also as far north as Rhode Island and as far south as Alabama and parts of Mississippi. During the time before rail transportation became available, cargo traveling inland from the coast had to be offloaded, carried around the rapids of the Fall Line Zone, and reloaded on wagons or smaller boats for the trip into the Up Country. A similar task had to be undertaken for cargo moving down toward the coast. All of this activity around the rapids, and all of the people required to do the work (and feed and entertain the workers), led naturally to the growth of towns. When railroads began to supersede river transportation, towns along the Fall Line Zone generally turned toward manufacturing using the locally abundant water power, initially converting it directly into mechanical power but by the late 1800's turning it first into electricity.

With their roots firmly planted in their long histories of trade and industrial production, cities in the Sandhills have overcome the agricultural shortcomings of the area and continue to grow. Deposits of valuable earth materials, important to industry, such as high-quality sand and some of the largest and purest deposits of kaolin clay in the country continue to support this region. A rich human history is associated with South Carolina's capital, particularly during the Civil War, and many landmarks of historic significance have been preserved. The natural history of this narrow band of Sandhills is, in many places, still unmarred, showcasing plant and animal communities uniquely adapted to the extremely sandy and consequently often-dry soils.

PLACES TO VISIT 🗺️

Columbia Canal/Riverfront Park. Downtown Columbia. For information call 803-733-8613 or 803-733-8331.

Columbia Museums of Arts, Corner Main and Hampton Streets, PO Box 2068, Columbia, SC 29202. For information call 803-799-2810.

McKissick Museums. 1403 Richland Street, Columbia, SC. Operated by the University of South Carolina. For information call 803-252-1450.

Peachtree Rock Preserve. For information call the South Carolina Nature Conservancy in Columbia, SC at 803-254-9049.

Carolina Sandhill National Wildlife Refuge/Sugarloaf Mountain. McBee, SC. For information call 803-335-8401.

South Carolina State Museum. Located in the Columbia Mills Building at 301 Gervais Street, Columbia, SC. For information call 803-737-4999, 803-737-4978, or 803-737-4921.

Riverbanks Zoological Park and Botanical Garden. 500 Wildlife Parkway--just off I-26 at Greystone Blvd. For information call 803-779-8717.

Foster-Dixiana Sand Quarries. Located on Hwy. 321 in West Columbia, SC. For information call 803-794-2872.

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STUDY AREA 4: SANDHILLS / MIDLANDS OVERVIEW

Activity 4-1: 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	GENERAL SOIL MAP	1: 594,000
6	COLUMBIA TOPOGRAPHIC MAP	1: 24,000
6	COLUMBIA LITHOGRAPH	1: 12,000
1	1850 Street Map of Columbia	Figure 4A-1
6	Wipe-off Pens	

PERFORMANCE TASKS

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

1. **Trace Sandhills boundaries and characterize topography.** →

Using the STATE BASE MAP #1, SHADED RELIEF, trace with a wipe-off pen the northwestern and southeastern boundaries of the Sandhills/Midlands Region. Name the counties that are included in this region. Why are the boundaries so irregular? How many streams or rivers flow completely across this region? How many streams or rivers begin in this region? Describe the typical Sandhills topography and explain how it differs from the surrounding landscapes.

2. **Characterize Sandhills soils and land use.** ⚙

Use the GENERAL SOIL MAP to determine the major soil types found in the Sandhills Region of the state. What percent of the soil in South Carolina is classified as sandhills type? Are these soil types found anywhere else in South Carolina? Use the LAND USE/LAND COVER MAP to determine the kind of vegetation typically found in the sandhills. What other land uses are common in the Sandhills/Midlands Region?

3. **Locate the center of the state.** 📐

Several different procedures can be used for determining the center of a geographic region. Most of these involve some form of mathematical calculation. Class groups can try to discover some of these methods on their own, or they may choose one of the two sample methods presented below. If they use the sample methods, students should divide into groups, follow the instructions indicated, and compare results during a class discussion.

Group I: Determine Center of Circumference of Circle

According to a report issued in 1786 (see paragraph entitled Choosing a Site for the New Capital on page 4-5) the suggested site for the new capital was the center of a circle . . . whose circumference strikes through the high hills of Santee crosses Santee at the confluence of Congaree and Wateree rivers and crosses the Congaree River at the confluence of the Saludy & Broad River[s] . . . Using the STATE BASE MAP # 1, SHADED RELIEF, draw a circle around the city of Columbia (use Columbia as the center point), with a wipe-off pen, with a diameter of 30 miles (radius of 15

miles). Does this circle match the one described in Senator John Lewis Gervais' bill to relocate the Capital of South Carolina to a central location? Mark on the map the site which would have been the center of the circle described in the 1786 report. How far is this spot from the present-day position of Columbia? Determine if the center of either circle is, in fact, the exact center of the state. How would you determine the center of South Carolina today? Why did the committee members make this statement . . . "such Maps of the State which they could possess themselves of . . ."?

Group II Determine Center of Mass of State

Cut out the shape of South Carolina from a piece of stiff cardboard. Try to balance this piece of cardboard on the sharp point of a pencil. Mark the location on the cardboard where balance occurs, then identify the corresponding location on the STATE BASE MAP #2, WITH HIGHWAYS. If Columbia is not located precisely at this point, how far is the capital city from the exact center of the state?

4. Evaluate potential locations for State Capital. 📄 ⚙️

On the STATE BASE MAP #2, WITH HIGHWAYS, locate the town of Wedgefield in western Sumter County (about 10 miles west of the city of Sumter at the intersection of Highways 763 and 261). Wedgefield is just south of the town of Stateburg (not shown on the map), which was General Thomas Sumter's preference for the new location of the State Capital in 1786. The leading competitor was the Columbia site, where Friday's Ferry crossed the Congaree River at the town of Granby, at the head of navigable water. Sumter argued that the Friday's Ferry location was far from healthy because it had so much nearby swampland; that the barren, worn-out, sandy soil produced only pine, which was not a good building material; that the planters lived more than ten miles apart; and that navigation, so necessary and essential to commerce, was bad on the Congaree. In contrast, the High Hills of the Santee and Stateburg offered higher ground, healthy air, good water, and superior soil. Did Sumter have a valid argument for making Stateburg the capital? Compare Stateburg, Columbia, and the "exact center of the state" as potential sites for a State Capital. Locate each site on the STATE BASE MAP #2, WITH HIGHWAYS. List pros and cons for each site, being sure to include references to landforms and landscape features to explain your answers. Which do you think would have been your personal choice for the Capital? Why do you suppose the Assembly chose the Columbia location?

5. Locate potential site for new county seat. 📄 ⚙️

Locate your county on the STATE BASE MAP #2, WITH HIGHWAYS, and also locate your county seat (the town where county government offices are located). Why do you think that particular town was originally selected? Suppose that the town residents got tired of having all the government offices in their town and voted to move the county seat to a new location. Where in your county would be the best place for a new county seat? Mark your selection on the map with a wipe-off pen and explain why you chose that spot. Refer to landforms and landscape features as well as population distribution and existing transportation routes. Would you recommend changing the location of your county seat?

6. **Locate towns important to transport of cotton.** ✨ 📖
 Before the development of railroads, cargo moving from the coast or inland to the coast had to be loaded and unloaded around the rapids of the Fall Line Zone. Located on major rivers, Hamburg, Columbia, Camden, and Cheraw became major towns and grew in importance with the spread of cotton into the upstate. They became major collection centers for cotton which was then shipped by steamboat or railcar to Charleston. Use the STATE BASE MAP #2, WITH HIGHWAYS, and a wipe-off pen to locate and mark the positions of Hamburg, Columbia, Camden, and Cheraw. What geographic similarity do they all possess?
7. **Trace route of Alexander Scaife.** ✨ 📖
 Use the STATE BASE MAP #2, WITH HIGHWAYS, and a wipe-off pen to trace the route that Alexander Scaife took to transport cotton on a barge from Chester to Columbia (refer to the story "The Cotton Boat" on page 4-7). If you were transporting goods today from Chester to Columbia on an 18-wheeler truck, which highways would you take? Mr. Scaife said they picked up sugar and coffee in Columbia. Where did these products come from? How did the sugar and coffee get to Columbia? Explain how this type of trade demonstrated the one-crop trading system which characterized South Carolina's economic pattern even in Scaife's time. Which ferries were mentioned in the account? Why were there so many ferries?
8. **Measure length of the Columbia Canal.** ✨
 Many canals were built in South Carolina because of the Internal Improvement Act of 1818. The most successful one in the state was the Columbia Canal. Most canals were built to bypass rapids and shoals on rivers. The Columbia Canal, however, has, for a long time, served a different function, as a productive hydroelectric plant generating peak power for Columbia residents. Using the scale bar on the COLUMBIA TOPOGRAPHIC MAP, measure the length of the Columbia Canal as it is today. Refer to the COLUMBIA LITHOGRAPH and again measure the length of the Columbia Canal using the scale bar. Do your results agree? Which value is the most accurate? Why? The original Columbia Canal was 3 1/8 miles long and extended from Granby in the South to Richland Street just north of the power plant by the South Carolina State Museum. Why do you think the canal was extended northward when power production became the main function of the canal? Most of the original portion of the canal is no longer in use, but can be identified on the lithograph as a narrow treeless pathway with light red tint. Mark this route on the lithograph with a wipe-off pen.
9. **Locate Civil War landmarks and retell stories.** ✨ 📖
 Use the location descriptions about the Civil War given in the Background Information and associated stories to identify where the following events took place in and around Columbia. Use the COLUMBIA TOPOGRAPHIC MAP and Figure 4A-1, "1850 Street Map of Columbia," found in the Brief Site Description for Study Site 4A. Once you have located each landmark, retell the story behind it in your own words.
- The secession convention (First Baptist Church)
 (Refer to page 4-8, The Secession Convention and the Onset of the Civil War.)
 - Move to Columbia of Confederate Printing Press (Gervais & Huger Streets)
 (Refer to page 4-8, Columbia's Importance to the Confederacy.)

- c. Surrender of Columbia by Mayor Goodwyn (trace routes with wipe-off pen)
(Refer to page 4-9, The Fall of Columbia.)
- d. First Baptist Church saved and Washington Street Methodist Church burned
(Refer to page 4-10, "One Account of the Burning of Columbia.")
- e. Eyewitness account of fires by Emma LeConte (South Carolina College)
(Refer to page 4-11, "Eyewitness Account of the Burning of Columbia.")
- f. Hampton-Preston Mansion saved by the Mother Superior (mansion & cemetery)
(Refer to paragraph on page 4-12.)
- g. Saving of Robert Mills House (Elmwood Avenue and Bull Street)
(Refer to paragraph on page 4-12.)
- h. Mann-Simons Cottage (Richland Street and Marion Street)
(Refer to paragraph on page 4-13.)
- i. The Blanding Street House (Blanding Street and Bull Street)
(Refer to paragraph on page 4-13.)

10. Locate site where Sherman fired on capitol. 📖 ⚙️

Locate on the COLUMBIA TOPOGRAPHIC MAP the site on the west bank of the Congaree River, in West Columbia, where Sherman's troops fired at the South Carolina State House. Today the site is identified by a historical marker along Highway 378 halfway between Highway 1 (Meeting Street) and Highway 12. Use the map scale to determine the distance that the shells were fired. General Sherman planned to cross the Congaree River and burn the capital city. But the South Carolina troops burned the bridge over the Congaree River as Sherman and his troops approached Columbia. General Sherman elected not to cross the Congaree River because of the depth and the swift current. To enter Columbia, he and his troops decided to find a more accessible route and camped on an island in the Saluda River in close proximity to the site of the Riverbanks Zoo. Locate the islands in the Saluda River where his troops may have encamped before entering Columbia. Why did Sherman choose this site to cross the rivers rather than farther south? Was this a wise decision? Why or why not?

11. Write story about person who is both hero and villain. ✍️

Some people are viewed both as heroes by one segment of the population and villains by another segment. Two such persons are highlighted in the story on page 4-10, titled "One Account of The Burning of Columbia." The unnamed soldier who burned the Church was viewed as a hero by the Yankee army but as a villain by the citizens of Columbia. Likewise, the unnamed custodian who sent the soldiers to burn the 'wrong' church was a hero to Baptist church members, but a villain to the Methodist worshippers. Using this story as a model, put yourself in the place of a citizen of the city of Columbia during the Civil War. Write a story about something you might have done which would appear heroic to one side and villainous to the other. Use the COLUMBIA TOPOGRAPHIC MAP to pinpoint a location for your story. Share stories within your group and select your favorite to tell to the entire class.

12. Trace drainage divide from Augusta to Columbia. ⚙️

Use the STATE BASE MAP #1, SHADED RELIEF, and a wipe-off pen to draw a line as straight as possible, connecting North Augusta, in Aiken County, with West Columbia, in Lexington County. Be sure not to cross any streams. You have just traced the Sandhills drainage divide. Trace the path of all streams north of the divide in red. Trace the path of all streams south of the divide in blue. How can you explain

the fact that the Sandhills in this area are higher in elevation than the Piedmont or the Coastal Plain? How has this drainage divide been used to advantage?

13. Use coded message to describe landscape. ✍

Sometimes people want to send information about their location to their friends while keeping it secret from others. Select any location in the Sandhills/Midlands Region that is identified on the STATE BASE MAP #2, WITH HIGHWAYS, and devise a coded message that will tell a friend your location. Exchange messages with others in your group and try to decode their messages to identify their locations. Use Dave's poetic verses on page 4-16 to give you ideas for coding your message.

ENRICHMENT

1. Research equipment used to build canals. ⚙️ 📖

During the Canal Age, South Carolina appropriated money for the development of canals. Research these canals and locate them on the map in your South Carolina history book. What equipment, that would be considered obsolete today, was used to build the canals? A good resource is Jim Casada's article "Carolina's Grand Canals" in South Carolina Wildlife, January-February, 1995, pgs. 36-40.

2. Ask legislator about transportation budget. 🗣️ 📖

In 1818, South Carolina Assembly committed \$1,900,000 towards improving transportation. These internal improvements included building of canals. Ask your legislator how much is budgeted today for internal improvements such as roads and bridges. Compare the equivalent of today's dollar with that of 1818. How does the 1818 dollar amount compare with today's figure?

3. Interpret Dave's poetic verses. ✍

Many of Dave's poetic verses (see paragraph entitled The Pottery Industry on pages 4-15 and 4-16) may contain cryptic themes and messages. Can you interpret his meanings? What is significant about Dave's verses beyond what he said? Clue: Check the slave codes and read between his lines!

The State

March 23, 1995

Studies indicate pollution could shorten life span

<p>The simple act of breathing could be shortening the lives of people in South Carolina's three largest cities, where a new study says a common form of air pollution is the culprit.</p> <p>After a ten-year study of cities across the nation, researchers at the Harvard School of Public Health, Brigham Young University and the American Cancer</p>	<p>Society concluded that breathing air with even average sulfate levels can shorten life spans. In Columbia, Greenville and Charleston, sulfate levels are above average. Sulfate pollution comes mostly from coal-burning factories and power plants. Diesel trucks and wood burning also are sources.</p> <p>Columbia has the state's dirtiest air, with 16 micro-</p>	<p>grams of sulfate per cubic meter, compared with a national average of 10.5 micrograms. Charleston measured 13.8 micrograms and Greenville, 11.</p> <p>Researchers said residents of the most polluted cities could lose about two years off their expected life span, while those in areas with average pollution levels could die prematurely by a few months or a year.</p>
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RATIONALE

Columbia is in the geographic center of the state, and it was selected as the capital city primarily because it was the junction point of two major rivers, the Broad and Saluda, which made it accessible to a large number of South Carolinians. The Columbia study site is unique, as it is geographically situated on three different geological regions, the Piedmont, the Sandhills, and the Coastal Plain. The Piedmont band of rolling topography runs in the northeast-southwest direction and is bounded by the Sandhills Region. Today, Columbia, like other urban and suburban metropolitan cities in South Carolina, needs services and resources to support its large population and busy economy. Water, electricity and natural gas are needed for both industrial and residential use. Transportation facilities such as airports, highways, and railroads are needed to link the people and resources. Space and land are needed for housing, businesses, factories, shopping centers, and utility corridors in urban areas. Specifically, Columbia is fully supported by the surrounding landscape, including forest land for timber, agricultural land for row crops and dairy products, and mining sites for building materials. Careful attention must be paid to the possibility of over-stressing the available resources of these areas.

Brief Site Description

Introduction

One important factor that has shaped the Columbia metropolitan area is the river system. The confluence of the Broad and Saluda rivers, flowing out of hilly terrain west and north of Columbia to form the **meandering** Congaree River, located in a flat terrain, is part of the expansive Santee River basin that drains central South Carolina. This river system provided Columbia with an important link with Charleston and made the area accessible for transportation of farm products. Ultimately, it made the Carolina midlands the state's center for trade, transportation, governmental affairs, cultural enhancement, manufacturing, and the home office of many businesses.

The village of Granby grew up beside Friday's Ferry about 1760. At the time of the Revolutionary War it was the most populous place on the Congaree River and one of the key points in the British defense. A strong house on high ground above the village was built and named Fort Granby. The capture of Fort Granby by the patriot General Lee made the British position in central South Carolina untenable and hastened the British evacuation. After the Revolutionary War, the town of Granby grew into a trading center for the present counties of Lexington, Newberry, and Saluda. It was the only important town between Camden and Augusta, and after 1800 it was also the terminus of the Santee Canal water transportation route. By 1796, three bridges had been built across the Congaree at Granby, and in 1796, it became the county seat of Lexington County.

When President George Washington visited the Columbia area, he was most favorably impressed by Granby and its citizens. He predicted that a great future lay ahead for the town of Granby, though he was not favorably impressed by Columbia itself. However, as the Capital City grew, merchants of Granby established businesses there. Columbia was free from the danger of floods and was less subject to disease and fevers. Eventually, the court house was moved, and the old town sank into decay. Buildings were demolished or moved while others burned or rotted. Granby slowly disappeared. Several cemeteries and the Granby Monument are all that remain today.

Naming the Streets of Columbia

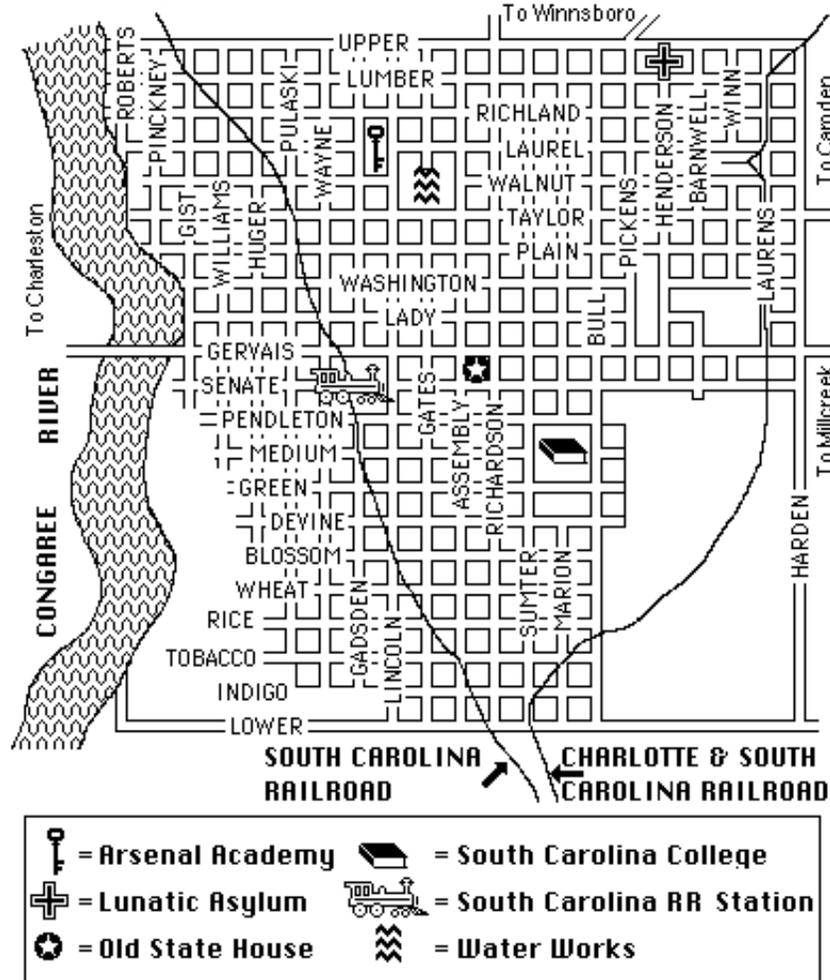
Columbia was probably one of the first planned towns in the United States. The Commissioners designed the new capital to be two miles square with two principle streets 150 feet wide. All the rest of the streets were 100 feet wide spaced ten streets per mile. These provisions called for 400 square blocks, each approximately four acres in size, to be divided into eight rectangular one-half acre lots. The State House was built at the intersection of the two principle streets, which were named Assembly and Senate in honor of the legislative bodies. All the north-south streets were actually laid out slightly northwest--southeast so they could run parallel to the Congaree River

The remaining streets were named as follows: North-south streets east of Assembly Street were named for South Carolina Revolutionary War Generals: Richard Richardson, Thomas Sumter, Francis Marion, William Bull, Andrew Pickens, Richard Henderson, John Barnwell, Richard Winn, and Henry Laurens. Harden Street was the east boundary. Richardson Street was re-named Main Street, with the Capitol Complex now carrying the name Richardson Square, and Winn Street was changed to Gregg Street honoring Maxcy Gregg the Civil War hero. Going westward, toward the Congaree River

parallel to Assembly, the streets were named for Continental Generals who fought in South Carolina: Horatio Gates, Benjamin Lincoln, Christopher Gadsden, Anthony Wayne, and Casimir Pulaski. The remaining north-south streets were named for Isaac Huger, Ortho Williams, Mordecai Gist, Thomas Pinckney, and Owen Roberts. Gates Street subsequently was renamed Park Street. Pinckney and Roberts streets for the most part no longer exist, because of encroachment by the waterworks and other public buildings.

The east-west streets lying north of Senate were named for statesmen and heroes. Gervais was named for John Lewis Gervais the statesman, and Lady and Washington were named for General George Washington and his "lady," Martha Washington. Plain was named for the Taylor plantation "The Plain." Later it was changed to Hampton Street honoring General Wade Hampton, the Civil War commander. Taylor was named after Thomas and James Taylor, the original owners of the Columbia property. Walnut and Laurel carried tree names after the most commonly used native

Figure 4A-1: 1850 Street Map of Columbia



Modified from Jones (1985) South Carolina One of Fifty States

CITY OF COLUMBIA - 1850

Figure 4A-2: 1995 Street Map of Columbia



CITY OF COLUMBIA - 1995

woods. Walnut was renamed Blanding in honor of Colonel Abraham Blanding, a civil engineer and lawyer who designed the first Columbia waterworks. Richland Street was named after another Taylor plantation. Richland County also carries this name. Lumber was named after the product of trees, probably in lieu of pine, the most commonly used wood at that time. Lumber Street was changed to Calhoun, honoring the eminent statesman, John C. Calhoun. Upper Street, the upper boundary, was later renamed Elmwood Avenue for the Elm tree.

The east-west streets lying south of Senate Street were named as follows: Pendleton for Judge Henry Pendleton; Medium, Green and Devine were named for citizens of the newly formed town. Later, Medium was changed to College Street honoring the South Carolina College, and is now part of the University of South Carolina campus. In recent years Green street has been changed to Greene, honoring Nathanael Greene, the Revolutionary War hero. Devine was misspelled for years as D-i-v-i-n-e. Many thought that it was named for the cotton bloom considered 'divine' because of its

critical importance to the early S.C. economy. The remaining east-west streets were named for well-known commodities. Blossom was named for the cotton bloom honoring the developing cotton industry. Wheat, Rice, Tobacco and Indigo were named for important crops of that time. Today, Rice is taken up by railroad tracks. Indigo was changed to Catawba Street named after a native tree. Later, Indigo was renamed Whaley in honor of W. B. Smith Whaley, the industrialist who owned a number of cotton mills in the area. Lower Street was so named because it was the lower boundary of the town. It now carries the name Heyward in honor of Duncan Heyward, a former South Carolina Governor.

Cotton Mills and Expansion of the City

During the early 19th century, many South Carolinians thought the state should be manufacturing more of its own cloth rather than selling so much of its cotton harvest to the New England states and Europe. But even by 1860, there were only three operating cotton mills in the state; only one of these was in Columbia. After the Civil War, entrepreneurs from the North, and from Europe, built many textile mills throughout the state, along with neighboring mill houses, stores, and schools.

The Olympia Mills section of Columbia, located just south of the historic district along the Congaree River, is an excellent example of a neighborhood that was almost completely dependent on the local mill for its economic livelihood. Mill sites were usually chosen based on proximity to a power source, whether water power or electricity, and access to transportation, primarily railroads. Mill villages often consisted of small lots with small houses crowded together, because the builders wanted to insure that everyone had quick and easy access to the mill, the school and churches, and the company store.

Mill villages as well as other local communities tended to retain their identity over the years even as the city of Columbia expanded around them. Because many people in mill villages were related to each other and knew their neighbors very well, these neighborhoods tended to remain as tight-knit communities with their own local flavor and customs. In recent years, the city limits of Columbia have expanded greatly and the metropolitan region now covers a large part of two counties, Richland and Lexington. As with most metropolitan areas, Columbia today is a composite of many different neighborhoods and customs, providing a diversity that enriches the city as a whole.

Elmwood Cemetery Once Thought to Be Haunted

Elmwood Cemetery is bounded on the south side by Elmwood Avenue (Highways 126 & 76) and on the west side by the Columbia Canal. The original plot of ground now occupied by Elmwood Cemetery (once called Tickleberry) was thought to be haunted. It was not converted to a cemetery until 1852, when a child of a professor at the South Carolina College (now the University of South Carolina) became the first occupant. The cemetery filled up rapidly, as many bodies were transferred from other depositories.

Street Railroad Changes Columbia

The introduction of streetcars changed the face of Columbia. In 1886, the Columbia Street Railway Company, with a capital stock of \$50,000, purchased six cars, and twenty-five to thirty horses. The first lines established began at the railroad station on Gervais Street. The total rail line extending from this point measured only four miles. A double track extended up Main Street to Laurel Street, where one track continued up Main Street to Elmwood then turned to go by the old Fairgrounds and the cemetery. The second track went out Laurel Street to Barnwell, then to Blanding, and then east to the Charlotte, Columbia and Augusta railroad depot. A branch from Laurel Street ran up Pickens Street to the state hospital. By 1888, only two years after the first cars ran, eight hundred passengers were using the street railroad every day.

Five years later, electric streetcars were introduced to the city. The line was extended from Blanding to Gregg and south to Taylor, then east to Heidt and south on Heidt to Gervais. The Gervais Street Branch was extended in 1895 to the Shandon Pavilion, near present-day Martin Luther King, Jr. Park. In addition, a new line ran off Elmwood south on Gadsden to Richland, where it turned east until it reached Main Street. One year later, the line from Shandon was extended northward on Harden to Gervais, then west along Gervais to Main, forming what became known as the "belt line." Riding along the belt line became a popular form of recreation, especially for children. Whenever the cars broke down, the superintendent of transportation took a horse and buggy along the route collecting the children and returning them to their homes.

Over the next sixteen years, two important rail line stems were constructed extending off the belt line. A line from Scott's Alley (one block north of Elmwood) on Main ran to Hyatt's Park and by 1912 all the way to College Park. The other major stem ran from the Shandon Pavilion out Devine Street, then to Garners Ferry Road and finally to Camp Jackson in 1917. Although the electric streetcar lines produced significant changes to city life, by 1920 the street railway ceased to be a major means of transportation in the city as automobiles made their debut.

The Mall Culture

The shopping mall is an important center of affairs for residents of urban areas. In modern cities are not yet the space-age domes envisioned by the science fiction writers of the past, the large shopping malls found in the urban and suburban communities of today certainly approach the ideals of self-contained living that those writers suggested. Services available in these huge, climate-controlled centers rise so far above simply buying and selling that, despite the fact that shopping is the economic reason for their existence, people no longer even call them shopping malls. Mall is the more normal and inclusive term, better because it is more general.

In addition to making retail purchases of all sorts, ranging from Afghan sweaters to Zebra fish, mall patrons can have an eye examination, consult a chiropractor, get a hair cut, mail packages, see a movie, play video games, work out at a gym, sign up for community college, buy life insurance, rent a tuxedo, enter a contest to win fabulous prizes, stroll through an automobile showroom, and enjoy a meal ranging from exotic cuisine from countries they may have never heard of to corn dogs and mustard on a paper plate. The list goes on. Even if this array of activities were all a mall offered, it might still live up to its potential as a clean, comfortable, safe city. But there is yet another sort of service.

Whether as a result of conscious planning on the part of mall administrators or as a spontaneous shift in usage by visitors, malls now perform many of the less-obvious community functions of a society. Young people meet there, whether just to hang out or to date. Kids visit Santa Claus before Christmas and look for Easter eggs among the usually real, and frequently beautiful, foliage of indoor plants. They trick-or-treat with their parents from store to store at Halloween time. Large numbers of folks regularly walk in the mall for exercise; in fact, special mall-walking shoes are available. Business meetings occur there. Charitable contributions are taken up. Clubs gather. Writers scribble at small tables. Old men read newspapers on indoor park benches. Families show off new babies. And the malls themselves are often visually inspiring, probably the biggest and perhaps the most beautiful buildings that many of the patrons have ever seen. The park, the social club, the art gallery, the playground, the street corner, the backyard--these and many other elements of a functioning urban community can all be found at the local mall, where they have all moved indoors.

Excerpt from the Diary of Martha Merritt, April 10th

By Jody Tinsley

I went to the Mall today, of all places, and I was just one of the five-hundred or so kids there. My parents decided I need "stimulation." Daddy said, "Martha, I think you ought to go to the Mall today and be with some of the other kids." Mother agreed, so they dumped me off this afternoon on their way to play golf. I just stood in the shade of the entranceway, staring after their car in the glare of the parking lot.

Being left at the door of the Mall by yourself doesn't make you look forward to the experience, but my parents weren't coming back for me until 5, so I had hours to kill. I pulled open the big, glass door and a stream of cold air rushed out by me. I was swallowed up inside.

It didn't take me long to realize that at the Mall, too, most of the kids are "ins" but some are "outs." As usual, I was an out. Just because I'd rather read than watch TV, half of the kids already think I'm nuts. If they knew I kept a diary they'd probably quit talking to me. I did run into some girls I know from gym class. We get along there so I said "hi," and they seemed glad to see me. We went to the music store, but Brooke Belmont was there with some of her friends. You should have seen how quick "my" so-called friends went over to hang around her. I just didn't want to, so I left the store while they were laughing at something.

Johnny Carr was there, in black jeans and a blue T-shirt, just coming out of the video arcade. He walked right over to me, and I thought, "I can't believe he's coming to talk with me." He wasn't. He just said "hi" and kept walking, going up to the phones behind me. I sat down on a bench and tried to listen, but the noise from the arcade was too loud. I was just sitting and watching an old man in a gray suit and hat reading a newspaper when a voice right beside me said, "He's always here. I call him The Ringmaster."

It was a boy I'd seen at school, but I couldn't remember his name.

"I'm David," he said. "You're Martha, from French class last year. Fermez la port," he said, pointing off into space just the way Madame Wilson had at the start of every class.

"Oh yeah," I laughed. "But what do you mean by The Ringmaster?"

"You know," he replied, "at a circus, the man who's always dressed up and shouting 'Ladies and Gentlemen!' Just watch."

In a few minutes a couple of old ladies walked near the old man's chair. He looked up from his paper and said something--we saw his mouth move--and he actually raised his hat. David swore the man had said "Ladies," but I don't know.

David said, "To me, this whole place is a circus, and I'm the only spectator."

"What are you talking about, David?" I asked.

"Come on," he said, "I'll show you."

And he did.

We went to the toy store and looked at the stuffed animals. An 18-foot snake curled in the rafters, and life-sized (almost) lions and bears wrestled in bins in the back. At the outdoor supply store, acrobats with ropes and chalked hands performed on the climbing wall. There was a fat lady buying frozen yogurt in the food court and lots of strongmen and women buying stuff in the health food store. The arcade noise sounded more like a calliope to me then.

We got popcorn from one of the concession stands and sat down to watch the parade of clowns fooling around under the Big Top of the Mall solarium.

I couldn't believe how fast 5 o'clock came. Maybe I need to write down more of what I saw before I forget it. Of course, I plan to go back before too long. David says he's usually there on weekends.

Activity 4A-1: Landforms of Metropolitan Columbia

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	GENERAL SOIL MAP	1: 594,000
6	GEOLOGIC AND MINERAL RESOURCE MAP	1: 1,000,000
6	COLUMBIA TOPOGRAPHIC MAP	1 : 24,000
6	COLUMBIA LITHOGRAPH	1 : 12,000
1	State Map of Major Drainage Basins	Figure 1-2
1	1850 Street Map of Columbia	Figure 4A-1
1	1995 Street Map of Columbia	Figure 4A-2
6	Wipe-off Pens	

PERFORMANCE TASKS

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

1. Locate the study site. → ⚙

Locate the Columbia 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. Locate physical features and place names. → 📖

Using both the COLUMBIA LITHOGRAPH and the COLUMBIA TOPOGRAPHIC MAP, name the rivers flowing through Columbia. In which direction are these rivers flowing? Notice that the Broad River has more sediment (water appears lighter) than the Saluda River. This pattern continues after the rivers join to form the Congaree River. Locate the rapids along the Broad and Saluda rivers that identify the Fall Line Zone. Locate the Columbia Canal and the dam on its lower end. Identify and name the bridges and highways connecting Columbia with West Columbia. What landscape features do you think were influential in encouraging early settlement in this area?

Locate and identify several famous Columbia landmarks such as the Williams Brice Stadium, the State Fairgrounds, Longstreet Theatre, rock quarries, the South Carolina State Museum, the University of South Carolina campus, Riverbanks Zoo, the South Carolina State Hospital complex on Bull Street, the Elmwood Cemetery, and the South Carolina State House and Capitol complex. Identify which downtown streets are named after Revolutionary War generals, Continental Army generals, prominent citizens, influential legislators, and important agricultural products.

Use Figure 4A-1, "1850 Street Map of Columbia," to document the carefully planned nature of the original city of Columbia. Then review the topographic map to compare

and contrast the street layout of the Columbia historic district (planned in detail in 1786) with the layout found in the newer communities which grew up around it.

Identify on both the map and the lithograph the major interstate highways skirting around Columbia. What features help in determining that these are interstate highways? Locate Highway 12 in West Columbia and Highway 227 in the upper right hand corner of the topographic map. Are these considered interstate highways? How can you tell what similarities and differences exist between these roads and interstate highways like I-20? Determine the amount of land area (in acres) used for the cloverleaf at the junction of I-26 and I-20 as seen on the topographic map. What types of businesses and industries would be attracted to locating near interstate highways? Why? Also locate the major power line right-of-ways servicing the Columbia area. Follow these lines across the Saluda and Broad rivers.

3. **Compare Piedmont and Coastal Plain.** → ⚙ 🗺

Using the COLUMBIA TOPOGRAPHIC MAP, identify examples of two Piedmont and two Coastal Plain landforms by contrasting patterns and spacing of contour lines. Use a wipe-off pen to trace the boundary between these two regions. Make a comparative list of the differences in landscape characteristics such as drainage, topography, elevation, soil types, land usage, and vegetation types. In which landform region do you find most of the residential areas? Agricultural areas? Industrial areas? Is this just by chance? Give some reasons for your answers.

As the Broad River and Saluda River flow across the Fall Line Zone into the Coastal Plain, the configuration of the topography and drainage pattern abruptly changes. Describe how the banks of the Congaree River would appear if you were riding down the river in a boat. How does the Congaree River differ from the Saluda and Broad rivers in appearance and velocity of the water? What topographic and floodplain differences are obvious? Locate the levee or dike on the east bank of the Congaree River. Follow the river route. Note the large, flat, cleared areas east of the levees. Why were these dikes built?

Use the information gathered from Part I and Part II to fill in the chart that follows. Once your chart is completed, summarize the differences in average elevation, relief, and average slope (river gradient) between the Piedmont and Coastal Plain. Why is the Sandhills Region completely missing along the Broad and Congaree River System through Columbia?

Part I Piedmont Landscapes

Use information on the COLUMBIA TOPOGRAPHIC MAP to describe the landscape of the Piedmont portion of Columbia. Is it flat, hilly, or mountainous? Find the highest and lowest elevation points in the area of Piedmont topography and enter your data on the chart provided. What is the difference in the elevation of the Broad River at the top of the map and at the Gervais Street Bridge in downtown Columbia where it merges with the Saluda River to form the Congaree River? Enter this data on your chart also. Determine the elevation of any five of the following landmarks in the Piedmont Region of Columbia, then calculate from that data an average Piedmont elevation value. Enter this average on the chart provided.

* Capitol building on Gervais Street

- * Richland Memorial Hospital on Highway 227 near Harden
- * The Governor's Mansion on the corner of Gadsden and Richland Streets
- * Elmwood Cemetery on Elmwood Avenue
- * Columbia Bible College on routes 21/321 in northeast Columbia
- * The South Carolina State Hospital on Bull Street
- * Benedict College at the corner of Harden and Taylors Streets
- * St. Andrew's School off route 176 just south of the interchange with I-20

Part II Coastal Plain Landscapes

Use information on the COLUMBIA TOPOGRAPHIC MAP to describe the landscape of the Coastal Plain portion of Columbia. Is it flat, hilly, or mountainous? Find the highest and lowest elevation points in the area of Coastal Plain topography and enter this data on the chart provided. Then calculate the difference in elevation of the Congaree River from the Gervais Street Bridge in downtown Columbia to the bottom edge of the topographic map. Now determine the approximate elevation of any five of the following landmarks in the Coastal Plain region of Columbia, and then calculate from that data an average coastal plain elevation value. Enter this data on the chart provided.

- * Sewage disposal plant in lower right hand corner of map
- * Community of Granby along the west bank of the Congaree River
- * The State Fairgrounds near the Community of Olympia
- * Railroad bridge over Congaree Creek west of the Congaree River
- * Williams Brice Football Stadium near community of Olympia
- * Cemetery in community of Arthurtown
- * The Gaging station on Highway 21/176/321 near the bottom of the map

	COMPARING REGION CHARACTERISTICS	
CHARACTERISTIC	PIEDMONT Part I	COASTAL PLAIN Part II
Highest Elevation (location & height)		
Lowest Elevation (location & height)		
Relief (highest - lowest)		
Average Elevation		
Change in River Elevation		
River Gradient		

4. **Compare topographic profiles of Coastal Plain and Piedmont.** ✨ 📄

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 crease to represent your horizontal axis. Next, draw in your vertical axis. Be sure you place your vertical axis at least one inch from the left side of your paper. The vertical scale should be approximately 5 centimeters = 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. Use the profile information to compare and contrast Piedmont and Coastal Plain topography.

Group I Piedmont Topography

Draw a straight line, using a wipe-off pen and a ruler, between Roosevelt Village School (on the east bank of the Broad River near the northern end of the Columbia Canal) and Alcorn Jr. High School (just off Fairfield Road near the top of the map on the right hand side). Use this as your base line for drawing a topographic profile.

Group II Coastal Plain Topography

Draw a straight line, using a wipe-off pen and a ruler, between Williams Brice Football Stadium (between the communities of Olympia and Arthurtown along Highway 48) and the water tower (labeled "WT" on the map on Taylor Road just west of the power lines and the Seaboard Coast Line Railroad in the town of Cayce). Use this as your base line for drawing a topographic profile. Use non-index contour lines if need be to get additional information.

5. **Interpret land use characteristics of study site.** ✨

With a wipe-off pen, draw a horizontal and a vertical center line on the COLUMBIA TOPOGRAPHIC MAP, so that you have divided the map into four identical segments or quadrants. Select one or more of the following map quadrants to analyze connections between topography and land use in the Columbia area. Also locate these features on the COLUMBIA LITHOGRAPH. Refer to the map symbols chart in your portfolio. Share your group's analysis with the rest of the class and, as a class, try to summarize the major concepts and concerns associated with city planning.

Group I Examine Northeast Quadrant

Describe the topography of this area. What streams are responsible for draining the land area? What is the direction of water flow in the creeks? What is the highest and lowest elevation in this quadrant? Determine the elevation drop, in feet, of Smith Branch Creek. Locate Crescent Hill Cemetery along Two Notch Road (US Hwy. 1) near Perry Junior High School (now W.A. Perry Middle School). What is the elevation of the cemetery? What is the elevation of Smith Branch Creek nearest to the cemetery? What is the elevation difference? Using the scale bar in the map legend, determine the distance in feet from the cemetery to the closest point on the creek. Why do you think cemeteries are built on high ground?

Group II Examine Southeast Quadrant

Describe the topography. Locate the railroad tracks along both sides of the Congaree River. What two companies own these tracks according to map information (both companies have since merged with other railroads--their new names are Norfolk Southern and CSX)? Why do these railroads tend to parallel the Congaree River? Locate the quarries on both sides of the Congaree River. Why are they located here? Why are so many ponds around the quarries? Are the ponds higher or lower in elevation than the Congaree River? Locate the sewage disposal plants in the lower right hand corner of the map on either side of the Congaree River. Why are sewage treatment plants located here?

Group III Examine Southwest Quadrant

Describe the topography. Locate Sixmile Creek and note the extent of its floodplain. Why are there so few houses or buildings located in these areas? If one were to build in this area, what events would pose a danger to the dwellings and their people? Why might Sixmile Creek flood quickly? Determine the elevations of several of the small ponds at the headwaters of Sixmile Creek. Are these natural or man-made? What purpose do they serve? Many of the smaller tributaries are represented by dashed and dotted lines. What type of tributaries are these? How do they differ from the solid blue line symbol representing Sixmile Creek? Locate the Columbia Metropolitan Airport in the lower left hand corner of the map. Why was the airport located here? Give several reasons.

Group IV Examine Northwest Quadrant

Describe the topography. Locate the Diversion Dam on the Broad River. The dam structure was intended to divert water into a man-made canal running adjacent to the river on its east bank. Why was the diversion dam built here instead of farther north or south? Locate the Zoological Park (Riverbanks Zoo) on the north bank of the Saluda River just west of its junction with the Broad River. Why is this a good location for a zoo? With a wipe-off pen, trace the streets in the red shaded areas between the Broad River and the Saluda River. How does this pattern differ from the street patterns in the pink shaded area of Columbia or West Columbia? Why is there such a different pattern? Does it relate to different land use? Consult the COLUMBIA LITHOGRAPH for additional information. How does land use differ in the pink, purple, white, and green shaded regions of this quadrant? Calculate the elevation of several schools in this area. Are schools usually built on high ground, or low ground, or is there no pattern? Explain your answer.

6. Locate sand and gravel mining sites. ✪

On the COLUMBIA TOPOGRAPHIC MAP, locate the gravel pit just south and west of Interchange 113 on Interstate Hwy. 26 (southwest quadrant). What is the connection between the occurrence of gravel types and the Sandhills landform region? What historical geological event was responsible for the formation of these particular economic deposits? List four possible uses of this commodity in the Columbia area. What modes of transportation are used to get this product to market? Why are there no gravel pits closer to downtown Columbia?

ENRICHMENT

1. Research long term impact of human use of urban rivers. →

Identify as many uses of the rivers in the Columbia Metropolitan area as possible. What are the positive and negative impacts associated with each current use? How do other uses affect the recreational uses of the river? What concerns would you expect the community to develop regarding extended use of the rivers?

Activity 4A-2: Urbanization of the City of Columbia

Materials

6	COLUMBIA TOPOGRAPHIC MAP	1: 24,000
6	COLUMBIA LITHOGRAPH	1: 12,000
1	1850 Street Map of Columbia	Figure 4A-1
1	1995 Street Map of Columbia	Figure 4A-2
1	Transparent Grid Overlay	
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 4A-1, "Studies indicate pollution could shorten life span." Explain how the study relates to the Sandhills/Midlands Landform Region. Identify on the COLUMBIA TOPOGRAPHIC MAP (refer to the COLUMBIA LITHOGRAPH if needed) some locations in the city where the worst sulfate air pollution might be found. Explain why you selected those locations. 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 in either the future or the past so that you have some changes to report. Choose an appropriate title (headline) and draw an appropriate picture to illustrate your main point.

2. Analyze land use changes through time. ⚙

Look in the margins of the COLUMBIA TOPOGRAPHIC MAP and the COLUMBIA LITHOGRAPH to determine the year the map was printed and the year the aerial photograph was taken. Examine both cartographic products carefully to identify any changes which have occurred during the interval. How many of these changes are man-made? How many have occurred naturally?

3. Analyze General Assembly's system for naming capital city streets. 📖 ✍

Outline with a wipe-off pen Columbia's Historic District on both Figure 4A-1 "1850 Street Map of Columbia" and the COLUMBIA TOPOGRAPHIC MAP. Explain the system for naming the streets of Columbia. Does this system seem like a good way to name streets? Explain. Compare the original names given to Columbia's streets by the General Assembly with today's names. Refer to Figure 4A-2 "1995 Street Map of Columbia." List the discrepancy between the original name and today's street names. Use the information on Naming the Streets of Columbia on pages 4A-2 through 4A-5 to determine why these name changes were made. The two main streets and boundary streets were designed to be 150 feet wide with all the other streets 100 feet wide. Why do you think the streets were laid out so wide? Were any of the Columbia Historic streets named for women? How are streets in your town or city named? Do any of the streets in your area carry these same names? In recent years, have any of your streets been renamed or named for distinguished people in your community? If so, name one of these streets and tell why the person was honored in this way.

4. **Trace city streetcar routes.** 📖 ⚙️

Group I Original Streetcar Routes

Refer to the street railroad information on page 4A-6. Then trace, with a wipe-off pen, the original streetcar route on the COLUMBIA TOPOGRAPHIC MAP. Transfer this route onto the COLUMBIA LITHOGRAPH. Identify at least six landmarks that were connected by the streetcars. Is the original streetcar route contained within the two mile grid laid out by the 1786 Act of the General Assembly? How were the first cars powered? What circumstances allowed the street railroad to convert to electricity? Why were streetcar routes eventually abandoned?

Group II Expanded Streetcar Routes

Refer to the street railroad information on page 4A-6 and the COLUMBIA TOPOGRAPHIC MAP. Trace, with a wipe-off pen, the expanded streetcar routes around Columbia as they formed the first belt line. Waverly became the first suburb of Columbia outside the original two square miles. Why did the streetcar routes extend to the north and southeast rather than follow the original grid pattern for streets as Columbia moved outward? Study the topographic map before you come to a conclusion. Notice that lots in the Waverly area are smaller than those in the original grid. Why would lot and street sizes have changed? What part did the streetcars play in the expansion of Columbia? Why were the streetcar routes eventually abandoned?

Group III Identify Belt Lines

Refer to the street railroad information on page 4A-6. Since early colonial days, Columbia has developed three transportation belt lines that provided transportation circuits around the city. Thus, Columbia residents and visitors have been provided with easy access to urban areas in and surrounding the city. On the COLUMBIA TOPOGRAPHIC MAP, identify the original two-mile-square belt line that accommodated several means of transportation in the 19th century. Next, locate highways on the map, which formed a partial belt line connecting suburban areas around Columbia during the 1900's. Finally, identify the interstates and limited access highway connectors that form the modern day belt line around Columbia.

5. **Locate granite mines and calculate depth.** ⚙️ 📖

On the COLUMBIA TOPOGRAPHIC MAP, note the active rock quarries located on both sides of the Congaree River near the community of Olympia. Granite is mined from these quarries. What historical geological processes occurred to make this area suitable for this type of mining? Describe how this commodity would most likely be transported. Name four potential uses for granite. How deep are the granite quarries? (If you were at the top of one of these quarries looking down, how many feet would it be to the bottom?) Which one is the deepest? Locate these same features on the COLUMBIA LITHOGRAPH. What keeps the Congaree River from flooding the quarries?

6. **Determine set of ordered pairs to locate Columbia landmarks.** ➔ 📖

Place the transparent grid overlay on top of the COLUMBIA TOPOGRAPHIC MAP. When the streets of Columbia were laid out, Senate and Assembly, named for the two bodies of the legislature, were the widest streets. Using their intersection as the origin point, locate the following places on the topographic map and determine their coordinates using ordered pairs. Also, locate as many schools as possible. Determine coordinates for three schools of your choice.

COLUMBIA LANDMARKS	ORDERED PAIRS
South Carolina State Capitol (House)	
Governor's Mansion	
Robert Mills Historic House (State Hospital)	
State Museum	
Woodrow Wilson's Boyhood Home	
Mann-Sims Cottage	
University of South Carolina Coliseum	
University of South Carolina Stadium	
Intersection I-20 & I-26, four leaf clover	
Location of School #1	
Location of School #2	
Location of School #3	

7. Estimate time of day air photo was taken. 📷

Use the COLUMBIA LITHOGRAPH to estimate the time of day that the infrared aerial photograph was taken, based on the angle indicated by shadows cast by various city buildings. You will actually be using the building like a huge sundial and reading the angle the shadow makes with the direction of true north. At noontime, the shadow should point directly north. Determine which way the shadow should point in the morning, and which way it should point in the afternoon. Look at several shadows on the lithograph and estimate as closely as you can the time of day that the aerial photograph was taken.

8. Locate malls and/or shopping centers and determine reason for location. ✨

Malls are places where many people gather at the same time. Look over both the COLUMBIA LITHOGRAPH and the COLUMBIA TOPOGRAPHIC MAP to try to identify buildings or groups of buildings which would qualify as a mall. What features on the map and/or photo led you to believe it was a mall? What other possible uses could these buildings have? Mark the location of the mall on the topographic map with a wipe-off pen. Why is this mall located where it is? What modifications of the landscape had to be accomplished before this mall was built? How would you get to this mall from the State Capitol Building? Mark your route on the topographic map with a wipe-off pen. Do you think the street system near the mall is adequate to handle all the mall traffic? Explain your answer. Pick a spot on the map where you would recommend a new mall be constructed. Mark that spot with a wipe-off pen. Consider factors such as the slope of the land, the effects of construction on surrounding woodlands or waterways, the reaction of local businesses and homeowners, traffic congestion, and land prices. Explain why you picked that spot.

9. **Locate places people congregate; ask why; write story about a trip.** ✍
- Name several other kinds of places where people congregate. Find these places on the COLUMBIA TOPOGRAPHIC MAP and/or COLUMBIA LITHOGRAPH. In terms of location, road size and layout, parking, etc., how are these places similar to a mall? How are they different? Write about a trip you have taken to a mall, a shopping center, or other public building. In addition to sharing your own experiences, include information about the location of the building(s), the date of your visit, and some indication about the size of the place you visited. You may find it interesting to write as Martha Merritt did in her diary entry beginning on page 4A-7.
10. **Compare modern day Historic Columbia to 1786 specifications.** 📏
- Prove that Historic Columbia is a two-mile square plot with two main streets running perpendicular, and that there are ten streets in each quadrant. Using a wipe-off pen, outline Columbia's Historic District on the COLUMBIA TOPOGRAPHIC MAP by marking Elmwood, Harden, and Heyward streets. Next, mark this same area on the COLUMBIA LITHOGRAPH. Use the scale bar located on the topographic map or lithograph to verify the dimensions of Columbia's Historic District. Next, mark Assembly and Senate streets and count the blocks in each of the resulting quadrants on the lithograph. What is the total number of blocks in Columbia's Historic District? How do you account for the discrepancy with the number of blocks (400) originally intended by the founders? How closely does the Historic Columbia District conform to the 1786 Legislative specifications outlined by the city fathers?
11. **Locate mill villages in Columbia.** 📖 📏
- The Olympia Mill village and mill buildings (labeled "Olympia") are clearly visible on the COLUMBIA TOPOGRAPHIC MAP near the southwestern corner of the historic district and also on the COLUMBIA LITHOGRAPH. Locate the two large mill buildings on the south side of Heyward Street. Select the easternmost of these two mill buildings and measure its perimeter and calculate its area. Also calculate the area of the State Capitol (southeast corner of Assembly and Gervais Streets). What is the straight line distance (as the crow flies) from the mill to the statehouse? What is the actual driving distance (following streets) from the mill to the statehouse? Why does a textile mill need to be so much larger than a government building like the statehouse when both have about the same number of employees?
- Describe the landscape in and around the Olympia Mill village. What are the major land uses in the areas bordering this community? Why are there so many railroad tracks in and around Olympia? How is the layout of Olympia (street patterns etc.) different from many of the newer residential areas of Columbia?
12. **Compare street patterns along Columbia riverfront.** 📖
- Refer to Figure 4A-1, "1850 Street Map of Columbia." Notice that north of the Gervais Street Bridge all of the streets reach the river banks. South of the bridge, only one of the streets goes all the way to the river. Use the COLUMBIA TOPOGRAPHIC MAP and the COLUMBIA LITHOGRAPH to try and determine a reason for this particular street pattern.

ENRICHMENT

- 1. Explain why there were no paved streets in Columbia until 1908.** 
Columbia had no paved streets until 1908. Access libraries to find books about Columbia; find out why the city and Richland County (or other cities and counties in the state) did not begin seriously paving streets until the 1920's. In conjunction with paving of roads, determine what happened in the 1920's that caused the eventual demise of street railways. Research the role the South Carolina Good Roads Association had in improving the road systems in the state.
- 2. Contrast life in Columbia in 1900 with life today.**  
Find photographs and drawings of early 20th century Columbia. From your findings, construct a chart contrasting life in Columbia around the turn of the century (1900's) to life in the city today. Use your research to develop a story to tell to your friend describing the sights you saw on a trip around the belt line. Be sure to include being picked up by a horse and buggy when the street car breaks down.
- 3. Estimate time of day aerial photograph was taken using trigonometry.** 
The sun is approximately 5 degrees north of the celestial equator in April when these infrared aerial photographs were taken. Columbia is situated at about 34 degrees north latitude. At midday the sun would therefore appear to be 60 degrees above the horizon, and building shadows would be at their minimum length. Research the height in feet of your favorite Columbia landmark and use this information, along with the trigonometric data, to calculate the length of the shadow at noontime.

Then compare the predicted shadow length with the actual shadow length and estimate the time of day the photograph was actually taken.
Note: Use the tangent of 60 degrees and a diagram showing similar triangles to visually outline your trigonometric procedures.

$$\text{height of building} = \text{Tangent } 60^\circ \times \text{length of shadow}$$
- 4. Relate accomplishments of people to Columbia's street names.**  
Use the information on Naming the Streets of Columbia on pages 4A-2 through 4A-5 to identify first names of the people who were recognized by having a street named in their honor. Next research at least six of these people to learn more about their part in the early development of South Carolina. Why were they honored by having streets named after them?

The News and Piedmont

June 17, 1984

Graniteville: A company town no more

by Paul Martin

It's 4 p.m. on a hot summer afternoon and the shift is changing at Graniteville Company. But workers and residents of this meandering textile town soon will experience more permanent and profound changes--changes that may mark the end of a lifestyle and the end of an era.

Graniteville is the quintessential mill town--truly a place where the mill is the town and the town is the mill.

In 1845, wealthy silversmith William Gregg of Virginia founded both, spending \$300,000 to build a cotton mill and "a village of comfortable cottages" for workers. A powerful father figure, Gregg shepherded his employees, forbidding the

use of liquor while prohibiting child labor and making school attendance compulsory.

He built and owned the homes where the workers lived, the churches where they prayed, and the parks where their children played. Gregg and his legacy, the Graniteville Co., provided the town's street lights, water, garbage collection, and sewage removal.

But when Miami financier Victor Posner completed a takeover in July 1983, residents braced themselves. The first change came in mid-1983 when the Graniteville Co. posted its first profit in several years. The second change will come July 1, 1984, when the area's 13 man Police Department is disbanded. The company is pulling out

of the law enforcement business after generations of providing protection, and "the responsibility of law protection for these people will fall on the shoulders of the sheriff," said Aiken County Council chairman Carrol Warner.

Warner said company-funded police protection is the first service to go, "They are going to phase out all the services they had provided."

Tom Taylor, life-long resident, said changes were more or less expected when the company was sold. "The town has benefited over the years from the generosity of the Graniteville Co., and I don't think we could expect another company to do the same," he said. "I just feel fortunate that we had it all these years."

RATIONALE

The Graniteville Study Site highlights a typical mill town along the boundary between the Sandhills and the Piedmont regions of South Carolina. The textile mills which developed in and near Graniteville relied on water power for running the machinery and required both the damming up of streams to create small reservoirs and the construction of a canal system for delivering water to the factory site. Ponds were also constructed to handle wastewater from the plants. Often this water was polluted with a variety of hazardous wastes. The Langley Pond Superfund Site in Graniteville is a prime example of the types of environmental problems which can result from improper disposal of industrial waste. Public access areas are located along the reservoir north of town and along Langley Pond south of the old mill site. Kaolin mining is also a major industry in the Graniteville area. Some of the abandoned mines are now used for landfills, and site restoration is a major concern.

Brief Site Description

Introduction

The Graniteville area is situated just below the boundary between the Piedmont and Sandhills regions. The lower elevation land along Flat Rock Pond just north of town sits on a highly weathered granite rock, best exposed in the spillway from the Pond into Horse Creek. This granite is the source of the name of the town, Graniteville. The high potassium feldspar mineral content of the rock produces exceptionally pure kaolinite clay when weathered. This clay, weathered from the granite over millions of years, is thought to be the major source of the kaolin clay deposits found in and around Graniteville. The higher elevations around town are Coastal Plain sedimentary rocks which cover and hide the underlying granite rock in most areas. Langley Pond has been designated as a Superfund Cleanup Site by the U.S. Environmental Protection Agency. Years of chemical wastes from textile manufacturing have contaminated the lake water and especially the sediment.

William Gregg and Manufacturing

William Gregg is considered to be the father of large-scale cotton manufacturing in the South. While South Carolina's antebellum economy was dominated by agriculture, Gregg was the most vocal advocate for "Domestic Industry" and saw it as a means of aiding poor whites by diversifying the state's economy.

At age four, after the death of his mother, William was sent to Alexandria, Virginia to live with his uncle, who was skilled at manufacturing watches and textile spinning machines. As a young man, Gregg was sent to Kentucky to become an apprentice to a master watchmaker and silversmith. In 1824, he came to Columbia, opened a business, and married Maria Jones, daughter of a wealthy landowner and store proprietor living in the Edgefield District. After a New Jersey businessman opened a small cotton and woolen mill near Graniteville that used the falling water of Horse Creek as power, Gregg became interested in the operation, but was appalled at the poor management he observed. Sensing an opportunity, William and his father-in-law purchased the mill and within a year Gregg doubled the profits. He soon became convinced that the cotton and slavery-based agrarian southern economy was not allowing the region to compete economically with the north. His views were published in the Charleston Courier and soon became widely known at a time when such issues were being discussed and debated throughout the state. His views indicate that he was an advocate for employing poor whites whom otherwise could barely eke out a living in the worn-out soils of the Sandhills and Piedmont Regions.

In 1845, the General Assembly officially chartered the Graniteville Manufacturing Company. By 1849, the company's weaving equipment consisted of 9,245 spindles and 300 looms and was the largest cotton manufacturing mill in the state. Gregg insisted that his mill use local workers, local capital, and local building materials. The mill and dams were built of blue granite that was quarried from beside a stream that ran near the factory site. Gregg also built a complete mill village for his workers and attempted to enforce high moral standards. He prohibited liquor, required school attendance for the children, and allowed no child below the age of 12 (school age) to work in his mill. To house his employees, he built gothic style cottages with steep roofs, peaked dormers and eaves finished with scroll-cut woodwork giving the appearance of gingerbread houses. He

rented these houses for \$16 to \$25 per year even though it cost him \$400 to build each house. Obviously these houses were not built to make money, but to provide better living conditions and to serve as an incentive for workers. Most of his employees were women and their male children over the age of fourteen. Their husbands became tenant farmers on land he leased to them. Men working at the mill were paid \$4 to \$5 per week, women were paid \$3 to \$4 per week and children between the ages of twelve and fourteen were paid \$1 to \$2 per week. Slaves were not employed at the mill.

Children under the age of twelve were required to attend Gregg's school from 8:30 AM to 4:30 PM each day for nine months. He provided transportation to and from his Graniteville Academy each day, and he often served as the truant officer by policing local swimming and fishing holes and leading students back to class by the ear or at the point of his buggy-whip. Gregg is credited with establishing the first free, compulsory public education system in South Carolina and one of the first in the nation. He also looked after the spiritual well being of his mill families by building two churches, St. John's Methodist and St. Paul's Episcopal. Legend suggests that St. John's Church served as a station on the Underground Railroad taking slaves to freedom in the days before the Civil War.

In what is often considered the last Confederate victory of the Civil War, General Sherman sent a detachment of northern troops to destroy the Graniteville Mill and presumably the rest of Graniteville as well. Confederate General Joseph Wheeler's men defeated Union General Judson Kilpatrick's cavalry regiment at the Battle of Aiken on February 11 and 12, 1865. This victory saved not only Graniteville, but also the towns of Aiken and Warrenton from the ravages of Sherman's march through South Carolina. Even though his mill furnished cloth and yarn for the Confederate government during the Civil War, Gregg resented the practice of forcing Southern mills to furnish cloth and yarn at cost, to be exchanged by the government for agricultural products that the farmers were unwilling to sell for Confederate money. He also opposed the draft, which had resulted in a decrease in the number of available workers, and other Confederate policies which greatly increased the price of supplies. After the war, Gregg attempted to modernize his mill but died in 1867 after working in waist-deep water to repair a mill dam.

Mill Town Legends

Like most mill villages and other small towns, Graniteville has accumulated its own unique set of homegrown stories and legends. The closeness of the community, both physically and culturally, tends to promote this type of sharing of events through storytelling. Also, in such a community it is very difficult to keep secrets for very long. When people have very few facts about an event, they tend to let their imagination fill in the blanks for them, and before long a legend is born. Generally such legends are built around actual events and real people and places, but there is usually a mystery or strange, unexplainable occurrence associated with the event. The story, "The Little Boy's Grave" on page 4B-4, is a good example of how a legend can start.

The Little Boy's Grave

Adapted by Christy Clonts from Elinor Fogle's William Gregg and the One Hundred Twenty Six Years of the Graniteville Company.

Legend has it that in 1855 a little boy, too young and too sick to travel, was put off the train in Graniteville. He was cared for by the proprietor of the local hotel until his death. No one ever knew his name or where he came from.

The people of Graniteville "nickled - up" to have a coffin made and a tombstone put on his grave. It can be found in the local cemetery with "Little Boy 1855" on it. Flowers have mysteriously been kept on his grave ever since.

Kaolin Mining and Environmental Restoration

All of the kaolin mining in South Carolina is surface, or open-pit, mining. This type of mining is very economical for the industry, but often leaves large holes in the ground which are unsightly and can be dangerous as well. South Carolina law requires that such areas be reclaimed to become farm lands, woods, lakes, or pasture land. Often, industry representatives and civic leaders can come up with innovative ways to use abandoned kaolin mines. In the Graniteville area, several examples of such innovation can be seen on the infrared image. The large mine west of the golf course and north of Langley Pond is currently being used as a landfill for construction waste such as scrap wood and wallboard, roofing materials, cinderblock, and brick. As material is added to the pit, it is covered periodically with dirt. Eventually the pit will be filled in completely and planted in grass or trees.

Another abandoned kaolin mine, just visible along the southern boundary of the lithograph, is being used as a sanitary landfill for household trash and garbage. This material is covered with dirt daily and planted with grass. The older part of this landfill has been outfitted with wells and pipes to collect methane gas generated from the decaying waste. The existing field has a total of twenty-two wells and a newly covered adjacent field contains an additional four wells. The methane gas is collected, piped across the highway, and used by an operating kaolin processing plant to heat the ovens which dry the kaolin clay for industrial use. This landfill will be producing methane gas for many years even after the it has been completely filled, covered and landscaped.

Activity 4B-1: Impact of Mining

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	GRANITEVILLE LITHOGRAPH	1 : 12,000
6	GRANITEVILLE TOPOGRAPHIC MAP	1 : 24,000
1	State Map of Major Drainage Basins	Figure 1-2
1	The Geologic Time Scale and South Carolina	Figure 1-6
6	Wipe-off Pens	

PERFORMANCE TASKS

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

1. Locate the study site. ➔ ⚙

Locate the Graniteville 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. Determine elevation of clay pits to assess rock structure. ⚙

The GRANITEVILLE TOPOGRAPHIC MAP shows the location of many mines which have been dug into the sandhills topography. All these claypits or strip mines are taking material from the same rock formation which is very rich in kaolin clay. Use contour line information to determine the approximate elevation of the clay deposit at each of the following mines. Use that information to describe the rock structure in this area. (Are the rocks horizontal, tilted, vertical, or folded?) Explain your answer to the class.

location of claypits:

1. Large mine northwest of Langley Pond elevation =
2. Small claypit near I-20 interchange in Northwest quadrant of map elevation =
3. Claypit northeast of Richardsons Lake, Southeast quadrant of map elevation =
4. Small claypit near three unnamed lakes, northeast quadrant of map elevation =

3. Explain why there are no claypits around Langley Pond. ⚙

Why is the clay found mostly at higher elevations and not around Langley Pond? Is it more likely that the clay never formed there, or that it formed and was later removed by erosion? Explain your answer. Where would you look to find new locations for claypits?

4. **Interpret the white areas on Graniteville Lithograph.** ✪
On the GRANITEVILLE LITHOGRAPH, there are several large white regions scattered around the area. What do these white areas represent? Refer to the topographic map to get some clues. What are the blue regions within the white areas? What purpose do they serve? Explain why infrared aerial photographs show these particular colors on the lithograph.
5. **Analyze why clay pits are not distinguishable by contour lines.** ✪
Look at several kaolin mines on the GRANITEVILLE TOPOGRAPHIC MAP. The claypit symbols are simply placed on top of the pre-existing contour lines. Why are the clay pit depressions not shown by contour lines? What are the advantages and disadvantages of not showing the contour lines of the open pit mines?
6. **Evaluate and characterize reclaimed mine areas.** ✪
Locate the very large kaolin mine along the lower edge of the GRANITEVILLE LITHOGRAPH. About one-fifth of that clay pit has been filled in and reclaimed. How can you identify the reclaimed area on the lithograph? What features are visible which indicate this land area is different from its surroundings? Why does it appear that way in the infrared image? How would the reclaimed area look to a ground observer?

ENRICHMENT

1. **Research construction materials made from clay.** ✪
Clay is also important in producing materials used in building construction. What construction materials are produced from clay? Locate the major manufacturers of brick and clay pipe in South Carolina. Where are they concentrated? Why is this so?
2. **Describe successful reclamation methods.** ✪
Contact one of the four kaolin mining companies operating in the Graniteville area: Cyprus Industrial Minerals, Dixie Clay, J.M. Huber, or W.R. Grace. Ask for information on how they are reclaiming old clay pits. Which reclamation methods are most successful in the Graniteville area?

Activity 4B-2: Textile Mill Town

Materials

6	GRANITEVILLE LITHOGRAPH	1:	12,000
6	GRANITEVILLE TOPOGRAPHIC MAP	1:	24,000
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 4B-1, "Graniteville: A company town no more." Explain how the story relates to the Sandhills/Midlands Landform Region. Identify on the GRANITEVILLE TOPOGRAPHIC MAP (refer to the GRANITEVILLE LITHOGRAPH if needed) where the places and events named in the story might be located. 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 in either the future or the past so that you will have some changes to report. Choose an appropriate title (headline) and draw an appropriate picture to illustrate your main point.

2. Analyze land use changes through time. ➔

Look in the margins of the GRANITEVILLE TOPOGRAPHIC MAP and the GRANITEVILLE 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 man-made? How many have occurred naturally?

3. Trace the path of Horse Creek. ⚙

Using the GRANITEVILLE TOPOGRAPHIC MAP and a wipe-off pen, trace the path of Horse Creek from Vaocluse Pond to beyond Langley Pond. Note that Horse Creek continues from the spillway at Flat Rock Pond and not Bridge Creek Pond. What happens to the elevation of the land area from Vaocluse to beyond Langley Pond? How large is this elevation change, and why does it happen? Note the change in the size of the creek and its floodplain from Vaocluse to beyond Langley Pond. What happens to the creek size and why does it happen? Why did the mills first locate along Horse Creek? Why was Vaocluse Pond constructed? Why were Flat Rock Pond and Bridge Creek Ponds constructed? Why was Langley Pond constructed?

4. Explain use of Graniteville canal. ⚙

On the GRANITEVILLE TOPOGRAPHIC MAP locate the canal just south of Bridge Creek Pond. How was it formed? What might it be used for? Look at the end of the canal. Where does the water in the canal go? What changes might occur to this water from the time it leaves Bridge Creek Pond until it arrives in Langley Pond?

5. **Evaluate site for Leavelle McCampbell Middle School.** ✨
 Locate the school just east of the canal mentioned in Performance Task #4 on page 4B-7, on the GRANITEVILLE TOPOGRAPHIC MAP. Note that although no name is given on the map, this is Leavelle McCampbell Middle School, built in the 1920's. The main building of the school is marked with the flag symbol on the map. The gym, cafeteria, and music rooms are just east of the main building. The large gray patterned areas on the west side of the canal are part of the original mill buildings. Is there an elevation difference between the two buildings of the Middle School? How can you tell? Describe and name the feature located in between the two school buildings. Why was the school located here? Note that the houses around the school are rather large old houses while the mill workers' houses are mostly on the west side of the mill buildings.

6. **Locate Cemetery for "The Little Boy's Grave" story.** ✨
 Refer to the story, "The Little Boy's Grave" on page 4B-4. The boy was buried in the cemetery located east of the Leavelle McCampbell school, called the Graniteville Cemetery. Locate this cemetery on the GRANITEVILLE TOPOGRAPHIC MAP. What is the elevation of the cemetery? Locate other cemeteries on the map. Are cemeteries usually located in populated areas? Why are cemeteries usually located on hills?

7. **Explain why the old mills are located near water.** ✨ 📖
 The original textile mill buildings were located on the west side of the canal. New modern textile mills have since been built about a mile west-northwest of the original buildings. Locate these new buildings on the GRANITEVILLE TOPOGRAPHIC MAP. Why did the old mills need to be located by water, but not the new mills? Note that each new mill has a water tower. Locate these on the GRANITEVILLE LITHOGRAPH. How do the mills get water into these water towers?

8. **Identify changes associated with new high school.** ✨
 The new Midland Valley High School was built in 1980. The GRANITEVILLE LITHOGRAPH shows this school but the GRANITEVILLE TOPOGRAPHIC MAP does not. Locate the school on the far west boundary of the lithograph just west of Langley Pond. Why is the school not shown on the topographic map? What changes have occurred to this parcel of land as a result of the school being built? What changes in the streets and highways were made to accommodate the new facility? Compare the building size to the size of the Leavelle McCampbell Middle School mentioned in Performance Task #5 on page 4B-8. Which school would you rather attend? Why?

9. **Explain color change in Langley Pond.** ✨
 Locate Langley Pond on the GRANITEVILLE TOPOGRAPHIC MAP and the GRANITEVILLE LITHOGRAPH. Why does the color of the water on the lithograph change from one part of the pond to the other? Trace the drainage into this pond. How many mills drain into this pond? What is the linear feature which almost cuts Langley Pond in half? Why was it originally constructed? What function does it serve today?

10. Investigate features associated with a golf course. 🗺 ⚙

Locate the Midland Valley Golf Course in the upper center of the GRANITEVILLE LITHOGRAPH and the left center of the GRANITEVILLE TOPOGRAPHIC MAP. What features allow you to easily identify a golf course? Does the pond in the course contain much sediment? How can you tell? Calculate the par values for each hole on the golf course. To do this you must use the scale bar to determine the length of each fairway on the course. Any distance less than 300 yards should be counted as Par 3. Any distance between 300 and 400 yards should be counted as Par 4, and any distance over 400 yards should be counted as Par 5. Add up your answers to calculate the total par value for the course.

11. Brainstorm questions about the boy in "The Little Boy's Grave" story. ✍

The story, "The Little Boy's Grave" on page 4B-4, leaves one with more questions than answers. Brainstorm a list of all the questions that come to mind after reading this story. Use information from the GRANITEVILLE TOPOGRAPHIC MAP and the GRANITEVILLE LITHOGRAPH to try to find answers to your questions. Weave your answers into different types of written documents from that time in history. Examples: birth certificates, marriage licenses, newspaper articles, journals, letters, health records, etc. When you have an entire file of documents, review them for inconsistencies or contradictions and revise them as necessary. Can you tell the story of this little boy's life from your file? Or his mother's life? Or the hotel proprietor's life?

12. Explain relative decline in importance of Graniteville. 🗺

In the 1800's, Graniteville was considered to be one of the most important cities in South Carolina because of the economic impact of its textile mills and kaolin mines. During the late 20th century, however, Graniteville increasingly has been overshadowed by the rapid growth of neighboring cities such as Aiken and North Augusta until it has lost much of its earlier importance. Examine the Graniteville - Aiken - Augusta area on the STATE BASE MAP #2, WITH HIGHWAYS and speculate about some causes for Graniteville's decline and the corresponding expansion of Aiken and North Augusta.

ENRICHMENT

- 1. Research how your school got its name.** 📖 ✍️
The Leavelle McCampbell Middle School was named after an early community leader. Research your school's name and write a short article about it. Submit the article to your school newsletter.
- 2. Compile list of idioms commonly used in your community.** ✍️
The term "nickle-up" is used in the story, "The Little Boy's Grave" on page 4B-4, to mean they took up a collection. Begin compiling a list of idioms (the language peculiar to a community, people, or class) that are commonly used in your community or family. Try to determine how each idiom began. Do you use these idioms? In what types of writing or conversation are idioms used most often?
- 3. Write your Congressman about Superfund Clean-up Program.** ✍️
Langley Pond has been designated as one of the Federal Superfund Clean-up Sites. Write your Congressman to find out how this program works and whether continuing the clean-up is favored.

The State

November 9, 1996

To the Hounds

by Sammy Fretwell and Pat Robertson

The H. Cooper Black Field Trial grounds lie deep in the pines of South Carolina's largest state-owned forest.

On this land of rolling sand hills and thick brush, sportsmen have big plans to chase foxes with hounds. They want to use the property like bird hunters do: to see how well their dogs search for prey.

But fox hunters also want to erect a huge metal fence at Sand Hills State Forest to contain hounds and foxes. And that's where they've got some explaining to do. The fence would stand 5 feet 5 inches tall and with a 16 inch overhang at the top. It also would include a one-foot extension underground to

keep animals from digging beneath it. It would cover 15 percent of the state forest and would be the first of its kind on publicly owned lands in South Carolina. By some accounts, the fox hunting grounds would be the largest in the country.

Fox hunters say there's no reason for alarm. They won't kill foxes and only want a place to see how their dogs compare with others.

Still, environmentalists say it's dead-wrong to build a fence on public woodlands. State and federal agencies are also nervous about the unusual proposal.

Not only could the fence keep deer, wild turkeys and other wildlife from passing easily through the forest, it's bad policy to cordon off state recreational lands - especially for private

use, some critics say. In a recent letter to the state Forestry Commission, the S.C. Wildlife Federation said it is "very disturbed" about the proposal.

Fox hunters contend the fence will cover so much acreage it would have little measurable impact on wildlife or public use of the state forest.

Moreover, the Cooper Black property will become a prime spot for national fox-hunting competitions that could bolster the sagging economy of eastern South Carolina. It's up to the Forestry Commission to decide if the plan should include a fence, specifically to accommodate the fox hunters. It's preparing to hold public hearings later this month to let people voice their opinions.

RATIONALE

The Sugarloaf Mountain Study Site includes portions of both the Carolina Sandhills National Wildlife Refuge and the Sandhills State Forest. It depicts the characteristic landforms, soils, rocks, and vegetation typical of most sandhills localities. Xerophytic vegetation, stunted forests, and wide expanses of bare soil are evident. The cartographic products also illustrate the effects of a series of habitat management programs, such as placement of firebreaks, periodic timber harvesting, fluctuating water level in ponds, and maintenance of open fields. Such open areas are essential for preserving the natural diversity of the original sandhills habitat and protecting several threatened and endangered species. Sugarloaf Mountain is actually more of a hill than a mountain. This feature is a unique outcropping of iron-cemented sandstone which is more resistant to erosion than the surrounding rocks. A trail leading to the top of the mountain offers a panoramic view of the sandhills forest.

Brief Site Description

Introduction

The Sugarloaf Mountain Study Site includes portions of the Sandhills State Forest and the Carolina Sandhills National Wildlife Refuge. The area lies along the Fall Line Zone and is characterized by deep sandy soils that support an extensive longleaf pine forest and associated ecosystem. Scattered scrub oaks also are abundant and the dominant ground cover is wiregrass. The elevation of the area ranges from 250 feet to more than 500 feet above sea level. A patchwork of bottomland hardwood forests, cultivated and fallow fields, man-made ponds and lakes, and dry uplands makes this region one of the most diverse habitat areas in the state.

Sugarloaf Mountain

By most standards, Sugarloaf Mountain should really be named Sugarloaf Hill. The peak itself rises only about 160 feet above the surrounding plain, and the diameter of the hill is only about 500 feet. Across the road to the south is a similar, but smaller, peak named Horseshoe Mountain. A short trail leads to the top of Sugarloaf Mountain where a spectacular view stretches well into North Carolina. A fenced-in area at the top serves to confine visitors to the bare rock exposure and protect the vegetation on the steep slopes of the hillside from erosion.

The rock that makes up Sugarloaf and Horeshoe Mountains is an iron-cemented sandstone. The sand grains are very similar in size and shape to the sand grains found in the soil nearby. The iron cement most likely precipitated from ground water at a time when the sandhills were buried under other sediments and the groundwater table was much higher in elevation. Changes in pH (groundwater acidity) commonly occur around the groundwater table and can cause dissolved iron ions to come out of solution and precipitate as insoluble iron compounds. Only rarely does enough iron precipitate to produce a well-cemented rock that is sufficiently resistant to erosion to influence the topography, which explains why Sugarloaf Mountain is such a unique location.

Wildlife Habitat

When the Carolina Sandhills Refuge was established in 1939, this part of the sandhills region was heavily eroded and essentially barren. Wildlife was almost non-existent. The top priority was to restore damaged habitat so that native plant and animal populations could be re-established. Today, the Refuge serves as a demonstration site for a variety of land management practices designed to preserve and enhance the once dominant longleaf pine / wiregrass ecosystem and provide for the needs of migratory waterfowl. The Refuge normally supports over 190 species of birds, 42 species of mammals, 41 species of reptiles, and 25 species of amphibians.

Water levels in several ponds are lowered seasonally to encourage the growth of beneficial vegetation and to kill off unwanted underwater vegetation. Similar techniques are used on land, where some areas are planted in food crops for waterfowl, dove, turkey, and deer, while other areas are planted in drought tolerant legumes and grasses to enrich and stabilize the soil. Forested areas are clearcut and/or burned periodically to insure a balance between old and new growth timber. Firebreaks are long, narrow,

cleared areas that separate stands of trees and help control prescribed burns. Most all reforested regions will appear to have an unnatural boundary shape, and will display straight lines on aerial photographs which represent the planting of pine trees in straight rows. Some stands have been thinned to make it easier to harvest pine straw.

The Red Cockaded Woodpecker

The Carolina Sandhills National Wildlife Refuge is home to several endangered species, the most important of which is the red cockaded woodpecker. These woodpeckers prefer to nest in cavities of living longleaf pines, although loblolly and pitch pines are occasionally used as well. There are more than 1,000 cavity trees on the Refuge, all of which must be protected during the prescribed burns which are scheduled every three years. This restriction can cause major problems because the cavity trees are more susceptible to fire than are other pines. This site has one of the largest populations of the red cockaded woodpecker found anywhere in the world. Year-old birds are sometimes captured for relocation, to expand the population into other areas of the country where habitat is favorable.

A cluster or family group of red cockaded woodpeckers includes a mated pair and several helpers, which are young males. Each group of woodpeckers needs an average of two-hundred acres of pine forest, within a one-third mile radius of the cavity tree, to serve as a forage area. Wildlife biologists monitor the activity of clusters through the use of peeper scopes, which can peer into a tree cavity as high as 40 feet while the viewer remains on the ground.

Multiple Land Use

Most state and federal wildlife preserves adopt a multiple use land management philosophy. Not surprisingly, there is occasional disagreement over what uses should be allowed in which parts of the managed area. The Carolina Sandhills National Wildlife Refuge, for example, closes most of its property to the public and allows only day use by visitors. The Sand Hills State Forest, on the other hand, opens almost its entire property to hikers, mountain bikes, horse riding, and camping. Some lakes are managed primarily as habitat for migratory aquatic birds; others are managed primarily for recreation.

Sand Hills State Forest Recreation Rules

Excerpted from a brochure available from the South Carolina Forestry Commission

- No swimming allowed on the Forest
- Tree felling is not allowed. Only wood already on the ground may be collected and burned as firewood.
- All fires must be secured in designated fire sites. Fires must not be left unattended and must be fully extinguished before departure from fire site.
- Unlicensed vehicles are not permitted on any roads.
- Steps must be used when climbing Sugarloaf or Horseshoe Mountain.
- Bikes or cars with loud mufflers are not allowed on the Forest.
- Electric trolling motors allowed in all ponds.

Some of the cleared areas around Mays Lake (in the Wildlife Refuge along Long Branch) were managed as cooperative farms, meaning that the land was leased to local farmers to grow crops with the restriction that 25% of the crop had to be left in the field, unharvested, as food for wildlife. Mays Lake is named for a former property owner, Mr. May Johnson. Nearby Martin Lake is managed for migratory aquatic birds. The water is kept low most of the year, and is gradually filled for the fall migration season. In several places, cleared strips of land are maintained as food plots for wildlife. The Forestry Commission used to place leftover limbs and trash from clearcut areas in long, parallel windrows, but this practice has been discontinued.

The Old Wire Road

The Old Wire Road is a remnant of an early stage coach route that had one of South Carolina's first telegraph wires strung alongside of it. The road is not paved, and in certain segments within the Wildlife Refuge it is closed to vehicular traffic. In most places, Old Wire Road follows the top of a sand ridge to avoid problems with stream crossings. This is said to be the route followed by General Sherman's army during the Civil War when they marched from Columbia into North Carolina. Old breastworks can be found in the woods along Old Wire Road near its intersection with State Highway 102. A grave marker for a confederate soldier is located on Scotch Road near the turnoff for the Sugarloaf Mountain Recreation Area.

The Bombing of Patrick

An unusual clearing in the Carolina Sandhills National Wildlife Refuge, just south of Rogers Branch and east of State Highway 145, holds a special historical significance. During World War II, this part of the Refuge was used as an Air Force bombing range where pilots could practice their skills. The cleared area was mowed in such a way as to generate a large "X" shaped feature that pilots could use as their target. The "X" was lit up at night so pilots could practice after dark. On one occasion, a plane accidentally bombed the nearby town of Patrick, mistaking street lighting at the town crossroads for the intended target. Fortunately, the practice bombs contained flour instead of gunpowder, and no damage was done.

Today, the old bombing field still displays the "X" shaped pattern, but the lights have been removed. The north and east quarters are planted to wildlife food crops, while the south and west quarters are planted to grass. Special dove hunts occasionally take place on the site. Local citizens tell numerous stories of live ammunition and unexploded ordinance being found near this area. A few of these encounters caused serious injury to the teenagers who discovered them.

Agriculture in the Sandhills

Once outside the boundaries of the Wildlife Refuge and the State Forest, a variety of agricultural land uses dominate the countryside. Most of the soils in the area are low in fertility and have a low available water content (water available to plants). Orchards have always been successful in this part of the Sandhills due to the well-drained nature of the soil. Much of the commercial operation is situated on the Alpin soil type which is regarded as poor soil because it consists of pure sand throughout the root zone. Most

Agricultural operations today use irrigation. The orchard near the town of McBee uses wind power to distribute water through a sub-surface irrigation system. They fertilize the trees by dissolving the precise amount of nutrients they require in the irrigation water. Pecan trees have also been grown commercially. Several vineyards can still be found in the area. The largest of these is located north of the community of Bay Springs just east of Black Creek. This vineyard once supplied grapes to a nearby winery (across the road from the west end of the landing strip) which went out of business around 1996. The landing strip, although poorly maintained, is still in use, and the nearby rows of muscadine grapes still produce fruit.

In the 1960s, there was an effort to plant slash pine from the Low Country of Georgia into the Sand Hills State Forest because it grows more quickly, at least in its early stages, than the native pine tree species. Foresters discovered, however, that after a number of years, native stands surpassed the imported species in productivity. The Forest Service now has begun an effort to eliminate these stands of slash pine and replant those areas with the native longleaf pine.

Sand Hills Soils

The characteristics of the soils of the Sugarloaf Mountain Study Area are strongly associated with their landscape positions (see Five Factors of Soil Formation, p. 1-39). The soils of the broad ridge tops are dominated by the Alpin, Ailey, and Candor series. All of these have thick surface horizons composed of sand. Much of the original parent material was sand, but these upland soils may also have received aeolian (carried by wind) material over the years.

The Alpin series is almost entirely sand. The Candor series has a loamy subsoil that can hold some water for use by plants. The Ailey series has a partially cemented subsoil which impedes the downward movement of water, forming a perched water table. Because of their excessively drained sandy surface horizons, it is often difficult for seedlings and young plants to get started on these soils. Once roots have extended to deeper horizons that can hold more water, they are likely to survive.

Sideslopes are dominated by Ailey and Vacluse series soils. Vacluse series has thin, sandy surface horizons that overlie a dense compacted subsoil that severely reduces rooting depth of plants. It is highly erodible because of the steep slopes, and the shallow rooted nature of the plants that grow on it.

Bibb and Johnston series are two soils that dominate the floodplains in much of the Sand Hills region. Unlike the Piedmont region, most of the floodplain soils of the Sand Hills are wetlands. The Bibb series is found along the larger Sand Hills creeks and rivers, and is composed of layers of sandy loam and sand. Additional material is often deposited during floods. The Johnston series is characteristically found along the floodplains of the smaller creeks and streams, but is sometimes also found in the back swamps of larger waterways. It has a thick, black surface horizon that is high in organic matter (a common feature of wet soils).

Ogeechee series is a wetland soil that is usually found in low spots in the uplands, where water drained from the surrounding soils tends to collect. It is not associated with the floodplains.

Pelion and, to a lesser extent, Emporia series soils can be found on gently sloping footslopes and benches above the floodplain of Black creek. Pelion soils have sandy surface horizons and a dense subsoil that impedes root growth and water movement. It has a shallow perched water table at the top of the subsoil. Emporia soils are sometimes found on broad ridge tops as well as benches above the creek. It has a better water holding capacity than most upland soils in this area, and is therefore better suited to agricultural crops.

Hillside seeps and springs often form in the Sand Hills when a stream or gully erodes down through a perched water table. More reliable seeps were often used as household water sources for small farms and sharecroppers.

Figure 4C-1: Sandhills Soils Characteristics

Soil Series	Description	Location
Alpin	sand	Ridge tops
Candor	sand and loamy subsoil	Ridge tops
Ailey	sand and partly cemented soil	Ridge tops and side slopes
Vaucluse	thin sand with dense compacted subsoil	steep slopes
Bibb	sandy loam and sand	floodplains
Johnston	high in organic matter	floodplains
Ogeechee	poorly drained	wetlands in uplands
Pelion	sandy surface and dense subsoil	gently sloping footslopes
Emporia	sandy	broad ridge tops

Activity 4C-1: Sandhills Topography

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	SUGARLOAF MOUNTAIN LITHOGRAPH	1 : 14,400
6	SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP	1 : 24,000
1	State Map of Major Drainage Basins	Figure 1-2
1	The Geologic Time Scale and South Carolina	Figure 1-6
1	Sandhills Soils Characteristics	Figure 4C-1
6	Wipe-off Pens	

PERFORMANCE TASKS

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

1. **Locate the study site.** ➔ ⚙

Locate the Sugarloaf 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 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. **Locate and describe Sugarloaf Mountain.** ⚙ 📐

Locate Sugarloaf Mountain on the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP (upper center of map). What is the elevation at the top of this mountain? Calculate the contour interval of this map. What does this contour interval tell you about the typical land slopes in this part of the state? How much higher is the Sugarloaf Mountain than the recreation area directly to the west? What is the elevation of Horseshoe Mountain just across the road to the south? What is the elevation of the highest point anywhere on the map (look in the upper left hand corner). Why is this particular hill not named, even though it is higher than Sugarloaf Mountain?

Use your map information to locate Sugarloaf Mountain on the SUGARLOAF MOUNTAIN LITHOGRAPH. You can pick out the top of the mountain by locating the triangular feature which represents the log fence enclosing the bare rock exposure. How wide do you think the rock exposure must be to show up on the lithograph? Explain your answer. Next examine the lithograph colors around Sugarloaf Mountain and speculate about the type of forest found there. How would you interpret the large white area just northeast of the mountain?

3. **Correlate soil map patterns to lithograph colors.** ⚙

The SUGARLOAF AREA SOIL MAP inset included on the SUGARLOAF MOUNTAIN LITHOGRAPH shows soil classifications for a portion of Black Creek near the Bay Springs Community. The scale of the soil map is the same as the scale of the

SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP. With a wipe-off pen, outline on the topographic map the approximate boundary of the coverage of the soil map. Which category of soil type is associated with the Black Creek bottomlands? Which soil type is associated with the larger tributary streams entering Black Creek? Why do you think no slope classes are provided for these bottomland soils? Which soil type is associated with the grape vineyards north of Bay Springs?

Now use a wipe-off pen to draw the outline of the coverage of the soil map onto the SUGARLOAF MOUNTAIN LITHOGRAPH. Note that the scale is different, so the coverage boundary you draw will look larger on the lithograph. What color on the lithograph corresponds closely to the geographic distribution of the bottomland soil types? Use this information to speculate about the type of vegetation and land cover that would be found in this area. Refer to Figure 4C-1, "Sandhills Soils Characteristics" as needed.

4. **Compare routes of Old Wire Road, railroad, and Highway 1.** 📖🌟

Locate the Old Wire Road, the Seaboard Coast Line railroad, and U.S. Highway 1 on the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP. Fill out the table below and infer what was the most important factor in constructing each of these transportation routes. Use the entire route from one side of the map to the other. List one advantage and one disadvantage for each route, based on the topography of the Sandhills Region. Why do you think the builders of the railroad and the new main highway did not just build along the exact same route as Old Wire Road?

COMPARING ROUTE CHARACTERISTICS				
ROUTE	# OF STREAMS CROSSED	# OF INDEX CONTOURS CROSSED	HIGHEST ELEVATION ON ROUTE	LOWEST ELEVATION ON ROUTE
OLD WIRE RD				
RAILROAD				
HIGHWAY 1				

5. **Analyze reasons for different names for same feature.** ✍️

Locate McLean Pond and Mount Lake, in the upper center of the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP. Speculate about possible reasons why one body of water is called a "pond" and the other a "lake." Likewise, locate Rogers Branch and Little Alligator Creek, on the left hand side of the map. Speculate about possible reasons why one stream is called a "creek" and the other a "branch." Also, the words "draw" and "run" can name streams in other geographic regions. What language arts term is used to refer to different words that mean the same thing? Why do you think the English language has so many words that can be used interchangeably? What advantage does this give a speaker or writer?.

6. **Explain choice of location for landing strip.** 🌟

Locate the landing strip near Bay Springs in the upper portion of the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP. Also locate this feature on the SUGARLOAF MOUNTAIN LITHOGRAPH. Refer to lithograph colors and map symbols, especially contour lines, to devise an explanation for why this site was chosen for an airstrip. Analyze the land use patterns in this area and speculate about who might have used such an airstrip, apparently situated out in the middle of nowhere. Note the color

differences between some of the nearby paved and unpaved roads to infer whether the landing strip itself is paved or unpaved. What difference would it make (paved or unpaved) if you were trying to land a small plane on this airstrip?

7. Describe the layout of the town of Patrick. 📖📖

Many towns in South Carolina use a circle to establish their community boundary line. Locate the town of Patrick on the center right part of the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP. Trace the circular community boundary with a wipe-off pen. With another color wipe-off pen, trace the two main highways which intersect in the center of town. Measure the radius of the boundary circle. Calculate the area of the town using the formula for the area of a circle [$a = \pi r^2$]. Next, count the number of buildings within the town limits - but do not count the churches. Most of these buildings are houses. Try to calculate the population of the town of Patrick by estimating the average number of people living in one house and multiplying that number by the total number of houses. Discuss in your group how accurate you think your number really is. Divide the number of residents by the area of the town to calculate the population density of the community. Estimate the population density of your own community and compare it to the population density of the town of Patrick.

Compare the layout of the town of Patrick with the clearing that was used as a practice bombing target during World War II. Locate this clearing on both the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP (upper-left) and the SUGARLOAF MOUNTAIN LITHOGRAPH (left-center). Refer to the description in the background information on page 4C-4 for help in recognizing this feature. Explain how a pilot could have mistaken the crossroads of the town of Patrick for the "X" pattern in this field. How far is the field with the "X" from the center of the town of Patrick? How long would it take to fly from the bombing strip to the town (assuming a typical airspeed of 200 mph)? Speculate on the effect this time interval might have had in causing the pilot's error.

ENRICHMENT

1. Research significance of railroad location markers. 📖📖

Trace the route of the Seaboard Coast Line railroad on the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP. Notice the placement of numerous triangular symbols along the railroad that have been given names like "Mid A" (for Middendorf location A) and "Mid B" (for Middendorf location B). Measure how far apart such reference points were from each other on average. Contact a railroad company to find out why these reference points were originally needed and if they are still used.

2. Research Sandhills soils. ✨

The SUGARLOAF AREA SOIL MAP inset included on the SUGARLOAF MOUNTAIN LITHOGRAPH gives the names of several common Sandhills soil types. Select one of the ten soil categories, outline its distribution on the lithograph, and use library or internet resources to find out as much as you can about how that soil was formed.

Activity 4C-2: Wildlife Habitat Management

Materials

6	Transparent Grid Overlay		
6	SUGARLOAF MOUNTAIN LITHOGRAPH	1 :	14,400
6	SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP	1 :	24,000
6	Wipe-off Pens		

PERFORMANCE TASKS

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

1. **Compare land use inside and outside of preserves.** ✍

Trace, with a wipe-off pen, on the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP, the boundary of the Carolina Sandhills National Wildlife Refuge. Also trace, with a different color wipe-off pen, the boundary of the Sand Hills State Forest. Transfer both boundaries onto the SUGARLOAF MOUNTAIN LITHOGRAPH by drawing them in with different color wipe-off pens. Remember that the map and the lithograph are printed at different scales so you will be able to transfer only a portion of each boundary line onto the lithograph. Compare and contrast land use inside and outside of both the Refuge boundary and the State Forest boundary. What kind of land use information can you get from the lithograph? What kind of land use information can you get from the topographic map? Why do you think both boundaries are so irregular in shape?

2. **Analyze land use changes through time.** ➔

The SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP was printed in 1968 (the date is not shown on the map). Look in the margins of the SUGARLOAF MOUNTAIN LITHOGRAPH to determine 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 man-made? How many have occurred naturally

3. **Analyze the newspaper article.** ✍

Read the newspaper article on page 4C-1, "To the Hounds." Explain how the story relates to the Sandhills/Midlands Landform Region. Identify on the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP (refer to the SUGARLOAF MOUNTAIN LITHOGRAPH if needed) where the places and events named in the story might be located. 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 in either the future or the past so that you will have some changes to report. Choose an appropriate title (headline) and draw an appropriate picture to illustrate your main point.

4. **Express political opinion advocating your position.** ✍

Controversial issues usually generate heated debate among both proponents and opponents. Sometimes this debate is verbal, sometimes it is written down in the form of an editorial, sometimes it is expressed in pictures or with slogans. This type of communication is referred to as advocacy, and its purpose is to convince others that they should support the author's position on the issue. Use the issue of Fox Hunting

in the Sandhills State Forest (see Newspaper Article on page 4C-1) as your topic. Refer to the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP and SUGARLOAF MOUNTAIN LITHOGRAPH to get additional data to support your position. Set up a class debate on this issue by preparing a position statement as described below. You should try to be as persuasive as possible. To this end, you may exaggerate for effect, use humor, or stretch the truth a little bit, but do not include statements that are obviously untrue or that attack opponents personally.

- Group 1** Favor fox hunting in State Forest - prepare 3 minute oral presentation
- Group 2** Favor fox hunting in State Forest - write 100 word editorial
- Group 3** Favor fox hunting in State Forest - make poster with captions (slogans)
- Group 4** Oppose fox hunting in State Forest - prepare 3 minute oral presentation
- Group 5** Oppose fox hunting in State Forest - write 100 word editorial
- Group 6** Oppose fox hunting in State Forest - make poster with captions

5. **Rank relative ages of clearcut areas.** ✎ ⚙

Infrared aerial photographs give detailed information about the type of vegetation in an area. Such images are particularly valuable to foresters who use the information to determine the age and health of wooded areas. Note the various shades of red coloration on the SUGARLOAF MOUNTAIN LITHOGRAPH. Remember that this photograph was taken in winter, so evergreen trees, like pine, will show up in red and deciduous trees, like oak, will not. . Most of the Wildlife Refuge property is planted in pine trees, but there is one significant area of hardwoods. Where are the hardwoods located? Refer to the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP to reference locations as needed. What color represents open fields on the lithograph? Explain why there is no red coloration in a winter infrared photograph for these grassy areas.

Areas that have been clearcut will show no red coloration, because there are no live trees left. When these areas are first re-planted, there may be a small amount of red associated with the seedlings. As the trees grow larger, the amount of red color in the area increases. So the older clearcuts will appear redder than the younger ones. Another indicator of relative age is the appearance of windrows. Clearcut areas often will have dead tree limbs and brush piled into long parallel rows which are easily visible in aerial photographs. In recent clearcuts, the windrows are distinct and easily recognized. As the new trees grow larger, they tend to obscure the windrows. By the time the forest is fully grown, the windrows have largely decayed and can no longer be seen under the large tree canopy. Locate on the lithograph four different clearcut areas and mark them with a wipe-off pen. Use the following legend.

- Area 1 = freshly clearcut field with no windrows
- Area 2 = recently clearcut field with distinct windrows
- Area 3 = fairly old clearcut field with new trees and indistinct windrows
- Area 4 = very old clearcut field with full grown trees and no windrows visible

Compare your answers with answers from other groups in your class.

6. **Analyze Mays Lake Reservoir.** ✨

Locate on the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP the area where Clay Fork Branch and Long Branch flow into Black Creek (left center section of map). Now locate this same area on the SUGARLOAF MOUNTAIN LITHOGRAPH. The large black area there is called Mays Lake Reservoir. Why does the water appear black on the infrared photograph? Look carefully at the margins of the lake. Some segments are blue-gray and others are white. What information do these colors give you about the habitat along the lake shore? Trace, with a wipe-off pen, the outline of Mays Lake Reservoir onto the topographic map. Use the contour line information to explain why this reservoir was constructed in this particular spot.

7. **Analyze percentage distribution of soil types.** 🗺️

It is useful to know not only the classification of soil types, but also the percentage distribution of those categories. That information is needed to make reasonable generalizations about the soil characteristics of an area. Look at the SUGARLOAF AREA SOIL MAP inset included on the SUGARLOAF MOUNTAIN LITHOGRAPH. Notice that there are ten different soil categories listed, as well as a color code for water. Place the transparent grid overlay (small squares) on top of the soil map. For each small square on the grid, determine the predominant soil category in that area (the soil type that fills the largest portion of that single grid square). Keep a tally sheet so that you can mark the number of grid squares associated with each soil type. When you finish your count, examine your tally sheet carefully. Which soil type is most abundant in this area? Which soil type is least abundant? If you had to write a general description of soil types for the Wildlife Refuge, what would it be? Do not mention more than three soil types in your generalization.

8. **Correlate location of firebreaks with contour lines.** ✨

Locate as many firebreaks (thin white strips labeled "firebreaks") as you can on the left half of the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP. Approximately how wide is a firebreak? Use the map scale to calculate this value. The length of the firebreaks varies widely. Speculate about why firebreaks might come in different lengths. Try to correlate the orientation of the firebreaks with the contour line pattern on the map. What is one advantage of a firebreak that follows a contour line? What is one advantage of a firebreak that cuts across contour lines? Locate a few firebreaks on the SUGARLOAF MOUNTAIN LITHOGRAPH. How can you recognize a firebreak on the lithograph?

9. **Critique list of rules and regulations.** ✍️

Read through the "Sand Hills State Forest Recreation Rules" on page 4C-3. Locate on the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP, and mark with a wipe-off pen, all of the landform features mentioned in this list. It is important for the Forest Service to convey this type of information to visitors in a clear and concise fashion. Analyze each of the rules and comment on its clarity and its conciseness. Suggest wording changes to any of the rules that need improvement and explain how your changes would better express the intent of the recreation managers.

ENRICHMENT

- 1. Find examples of habitat managed for endangered species. ✨**

Contact the Carolina Sandhills National Wildlife Refuge to get information about the endangered species that are found on their property. Select one of these rare plants or animals and research the land management practices that have been set up to provide habitat protection for it. Locate places on the SANDHILLS TOPOGRAPHIC MAP and the SANDHILLS LITHOGRAPH that exhibit such habitat management.
- 2. Document changes in timber cutting practices. ✨📖**

Forestry practices have changed significantly over time. Research the history of logging as an industry and document the changes in timber cutting practices that have occurred in the eastern pine forests, such as are found in the Sandhills of South Carolina. Be able to summarize the principal scientific rationale for each of these logging methods and cite pros and cons for its use in the Sandhills. Use the SUGARLOAF MOUNTAIN TOPOGRAPHIC MAP and the SUGARLOAF MOUNTAIN LITHOGRAPH, to locate examples of as many types of logging strategies as possible.