Georgia is home to a diverse group of physiographic regions. From the mountainous Southern Blue Ridge to the Atlantic Coastal Flatwoods and Tidewater regions, the state offers many opportunities for recreation enthusiasts and natural history buffs.

The “Seven Natural Wonders of Georgia” is a list of areas across the state originally put together by librarian Ella Mae Thornton for the *Atlanta Georgian* magazine in 1926. There have been minor changes over the years, but the list remains very close to the original. These “seven wonders” (plus 2 more that aren’t on the official list, Cloudland Canyon and the barrier islands) are described for your general enjoyment. They are also fair game for test questions!
Cloudland Canyon is located on the Cumberland Plateau on Lookout Mountain. Lookout Mountain is a geologically transitional area between the flat-lying sedimentary beds of the Cumberland Plateau and the ridges and valleys lying to the east, which are more intensively folded and faulted. Sandstone is the dominant rock found in the canyon; shale layers below the sandstone are marked by pine trees.

A combination of seismic and erosional processes formed Lookout Mountain. It was uplifted during the Appalachian orogeny, which was the period of mountain building that formed the Appalachians. Over 200 million years ago the area was covered by ocean water, so when the mountain was first formed it was entirely underwater. The canyon rim eventually became a beach as the ocean receded. As the ocean dried up, erosional processes began. Sitton Gulch Creek and its tributaries, particularly Daniel Creek, eroded the rock, forming Cloudland canyon. The sandstone in the canyon fractures easily, creating large blocks and unique boulder formations. Lookout Mountain has a concave summit, so precipitation percolates through fissures in the underlying limestone and has formed miles of caves in the area.

The canyon is more than 1,000 feet (300 m) deep, ranging in elevation from 800 feet (240 m) to over 1,800 feet (550 m). The highest point in the area has an elevation of 1,980 feet (600 m). The bottom of Cloudland Canyon contains a slope of rock talus (fragments of sandstone and shale that have eroded and been transported downslope by gravity). The valley floor is also rich in fossil-bearing limestone.
**AMICALOLA FALLS – SOUTHERN BLUE RIDGE MLRA**

Amicalola Falls is the highest waterfall in the Southeastern U.S. and with a vertical drop of 729 feet is four times higher than Niagara Falls. “Amicalola” is the Cherokee word for "tumbling waters;" the falls drop off the ledges at the southern end of the Blue Ridge mountains. An eight-mile "approach trail" links the falls to the southern terminus of the Appalachian Trail.

Waterfalls can be classified as either "constructive" or "destructive." Amicalola Falls are of the destructive variety, which means that over time these falls will recede upstream as the watercourse erodes and levels.

The Blue Ridge province is bounded on the northwest by the Great Smoky fault, across which lies the Valley and Ridge province, and on the southeast by the Brevard fault zone, across which lies the inner section of the Piedmont province. The Blue Ridge province is primarily a physiographic designation. Because of this, many of the rocks making up the western Blue Ridge resemble the oldest rocks of the Ridge and Valley, while some rocks of the eastern Blue Ridge resemble those of the Southern Piedmont. The Hayesville and Allatoona faults separate the eastern and western Blue Ridge.

**Eastern Blue Ridge**

The eastern Blue Ridge consists of a variety of igneous and high-grade metamorphic rocks. These rocks were originally part of the Precambrian basement. During the early Paleozoic era, volcanic and sedimentary processes occurred as the proto-Atlantic Ocean began to close. Gold which formed as the hot rocks interacted with water and became concentrated in this area, resulting in future gold districts such as the Dahlonega area.

A thick section of quartzite (metamorphsed quartz sandstone) partially rings the large Tallulah dome and forms the steep bluffs of Tallulah Gorge in northeast Georgia. Migmatites, rocks with both metamorphic and igneous characteristics, make up other eastern Blue Ridge rocks and testify to the very high temperatures reached during mountain building.
Cypress swamps, winding waterways, and floating peat mats are major parts of the Okefenokee's habitat mosaic. Wet and dry prairies, swamps dominated by shrubs, and forests of blackgum and bay trees intersperse the array of other habitats. A high ridge of sand known as Trail Ridge forms the eastern edge of the swamp. More than 400 species of vertebrates, including more than 200 varieties of birds and more than 60 kinds of reptiles, are known to inhabit the swamp.

Geologic events, environmental variables, and human impact shaped the Okefenokee Swamp. More than sixty-five million years ago, during the Cretaceous period, the region was beneath the sea. Sandy, nutrient-poor sediments were deposited in this marine environment. In more recent geologic times the depression forming the basin of the Okefenokee Swamp was presumably created by wave action associated with an offshore sandbar. Today the depression is filled with fresh water and peat. The Seminole tribe called the area the "land of trembling earth."

Annual rainfall is approximately fifty inches and is the source of most of the water entering the swamp from the more than 1,400 square miles of upland watershed. The clear, tannin-stained, highly acidic waters of the Okefenokee generally are shallow, normally ranging up to depths of less than ten feet and averaging only two feet.

Most (about 85 percent) of the water leaving the Okefenokee is carried by the Suwannee River to the Gulf Coast of Florida. The St. Marys River, which flows into the Atlantic, drains the remainder of the swamp.
Coined "Georgia's Little Grand Canyon," Providence Canyon is located in the west central part of the state. The multicolored 1,109-acre network of gorges is more than 100 feet deep. Providence Canyon is unique as a natural wonder of Georgia in that it was caused by relatively recent erosion (from human activity) over the past 200 years. Hence, it is more anthropogenic than natural.

Historical accounts indicate that the canyon began forming in the early 1800s as the result of poor soil management practices. Native forest cover had been cleared so the land could be farmed, and early nineteenth-century farmers in this region took few measures to avoid soil erosion. Small gullies formed and rapidly grew deeper and more extensive. By 1850 ditches three to five feet deep had been cut into the land, further concentrating runoff and increasing the rate of erosion.

Providence Canyon consists of several chasms, plateaus, cliffs, and pinnacles. Erosion has exposed several million years of the geologic record within its walls. Minerals have stained the sediments, creating a display of colors that range from white to various shades of pink, purple, red, brown, yellow, and black. The sediments from which the soils formed were deposited by water in ancient streams, seas, deltas, and coastal beaches between 59 and 74 million years ago. Geologists separate the sediments forming the canyon into four major geologic formations: Baker Hill, Clayton, Providence, and Ripley.

The Baker Hill formation is youngest and was deposited about 59 to 62 million years ago.

The Clayton formation was also deposited during the Paleogene period, about 63 to 65 million years ago. The coarse sands are reddish in color, caused by the presence of iron oxides.

The Providence formation is the thickest geologic member. It is 119 feet thick and was deposited during the Cretaceous period, about 67 to 70 million years ago. The upper layer of this formation consists of very fine sand mixed with kaolin (a type of white clay). The middle layer is coarser-grained and more colorful, with crossbeds stained yellow by limonite and purple by manganese. The oldest layer is a black and yellow clay with high mica content.

The Ripley formation forms the canyon floor and was deposited during the Cretaceous period (about 70-74 million years ago). It is orange in color, and its composition varies from clay to massively bedded sand. This formation is the richest of the layers in fossils, but it is poorly exposed.

Providence Canyon continues to change due to surface water erosional processes and the undercutting force of groundwater. The high clay content of sediments in the floor of the canyon increases the resistance to erosion. Vegetational growth helps to stabilize the soil, reducing the rate of vertical erosion. Lateral erosion continues, and changes can occur quickly because the upper soils are soft.
Stone Mountain in metropolitan Atlanta is perhaps the best known of Georgia’s natural wonders. A granite dome rising 650 feet above the Piedmont plateau, Stone Mountain is about 2 miles long and 7 miles in circumference at its base, making it the largest exposed pluton in the world.

Stone Mountain is a pluton, a type of igneous intrusion. The predominantly granitic dome of Stone Mountain was formed during the formation of the Blue Ridge Mountains, which form the eastern edge or front range of the Appalachian Mountains. It formed as a result of the upwelling of magma from within Earth’s crust. This magma solidified to form granite within the crust below the surface.

The granite is composed of quartz, feldspar, microcline and muscovite, with smaller amounts of biotite and tourmaline. Embedded in the granite are pieces of foreign rocks (xenoliths) entrained by the magma. The xenoliths of the Stone Mountain granite are composed of two types of metamorphic rocks. One type is composed of gneiss and amphibolite from rock that was torn as the granite moved upward through the earth’s crust. These xenoliths are generally angular and foliated, and have feathery black amphibole around them. Other xenoliths are generally rounder and lack the amphibole. They also exhibit weaker foliation. These inclusions presumably came from the rock from which the granite formed.

The granite displays an east-west foliation and abundant muscovite. The muscovite is probably metamorphic in origin.

The granite intruded into the metamorphic rocks of the Piedmont region during the last stages of the Alleghenian Orogeny, which was the time when North America and North Africa collided. Over time, erosion eventually exposed the present mountain of more resistant igneous rock, in processes similar to those that have exposed Devils Tower National Monument in Wyoming.
TALLULAH GORGE
- SOUTHERN BLUE RIDGE MLRA

Tallulah Gorge is a canyon formation 3 miles long and 1,200 feet deep. Named after a Native American word for "terrible," Tallulah Gorge was traditionally feared as a home for evil spirits.

Current theory holds that this spectacular gorge was once sand on the beach of an island that existed in a pre-Atlantic Ocean. Over time, the sand was turned into sandstone through cementing and pressure.

During the Appalachian orogeny and formation of supercontinent Pangaea (between 500 and 245 million years ago), plate tectonics bulldozed the sandstone into what is now southeastern North America. The sandstone was thrust faulted (moved horizontally) two hundred miles inland over the billion-year-old North American crust. Mountain building processes generated heat and pressure that metamorphosed the sandstone into resistant quartzite. Shale was thrust along with the sandstone and metamorphosed into schist, which is interlayered with the quartzite.

Millions of years later in the Pleistocene epoch, the Appalachian Mountains had been eroded and smoothed and were forest-covered. The Tallulah River continued flowing and shaping the landscape. Upon reaching the resistant quartzite, meandering was not possible, so it sliced down through the quartzite, creating the steep-walled gorge.

Since the ancient beaches that formed the Tallulah quartzite were primarily sterile sands, when the quartzite weathers it forms soils that are acidic and generally nutrient poor. Soils on the rim and steep canyon walls are very thin.
Radium Springs has waters that are consistently 68 degrees and flow at a rate of 70,000 gallons per minute. These waters contain traces of radium and are the largest natural springs in Georgia. Radium is an element that is 1,000 times more radioactive than uranium. It occurs naturally in certain types of material and is extremely rare. Radium is luminescent and emits a faint blue glow. The area was called Blue Springs but was changed when trace levels of radium were found in the water.

Legend has it that Native Americans believed the springs to have healing properties and protected the springs from Spanish explorers searching for the “Fountain of Youth.” A successful casino was constructed in the early 20th century and was a popular destination for travelers. The casino was severely damaged in 1994 by the floodwaters from the Flint River during Tropical Storm Alberto and was eventually demolished.
Warm Springs – Southern Piedmont

Located on the lower slopes of Pine Mountain in Meriwether County, Warm Springs has long been known for its healing waters. Native Americans used to bring their wounded warriors to the springs, which have a year-round temperature of 88 degrees. A natural trap found about 2,800 feet underground heats the water. In the antebellum period a minor resort developed at the springs, later made world-famous by U.S. president Franklin D. Roosevelt. Roosevelt found relief there for his polio from the mid-1920s until his death at the Little White House, his home at Warm Springs, in 1945.

Pine Mountain

Pine Mountain is part of the Southern Piedmont geologic province. Located between the north Georgia mountains (Southern Blue Ridge and Southern Atlantic Ridges and Valleys) and the Coastal Plain, the Piedmont forms the foothills of the Appalachian Mountains, which formed during the Paleozoic era. Warm Springs is located along the north-central part of Pine Mountain.

The Pine Mountain ridge, extending from the Chattahoochee River to east of the Flint River, consists of Hollis quartzite, a metamorphosed quartz sandstone, as well as metamorphosed mudstone and (in Alabama) marble. This ridge was formed by a suite of sedimentary rocks deposited on the shallow shelf of the North American continent hundreds of millions of years ago.
Barrier Islands are constantly being reshaped by wind, currents, and tides. The power of these forces determines the shape of the islands. Georgia’s islands are generally rectangular in shape in sharp contrast to the narrow linear islands forming North Carolina’s Outer Banks.

Because Georgia lies in the heart of the South Atlantic Bight (a large indentation in the southeastern coastline), and the continental shelf is far off shore, the coastline is well protected from major storms, waves, and currents. This, coupled with a fairly high tide range (7-9 feet), makes the daily tides the most important force on island shape. Tidal currents generally run perpendicular to the coastline, forming wide, short islands from the sands and silts of the coastal sediments.

The short rectangular islands of the Georgia coast are more stable than the islands to the north and have developed more extensive maritime forests. Georgia’s barrier islands have been in roughly the same position for the last 4-5,000 years.

The actual formation of Barrier Islands requires a gently sloping continental shelf and a rising sea level. These two criteria were met over the last 20,000 years. Rising sea levels from the glacial melting of the last glacial period surrounded and isolated existing dunes to form islands. Sediments carried downstream were deposited behind these islands to form the rich salt marshes of the tidal zone. The typical form of the barrier islands includes a wide beach facing the open ocean, with slightly elevated dunes above the high-tide line. The maritime forest occurs on the interior of the islands, protected by the dunes. Vast expanses of salt marsh stretch between the islands and mainland. Scattered hammock forests protrude from the otherwise unbroken waves of saltmarsh cord grasses.