

OUR STATE
and OUR NATION

Georgia Studies

UNIT **1**



Setting the Stage

CHAPTER 1 Let's Talk Geography ▼

[What is Geography?](#)

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GEORGIA EVENTS ▼

- 1526** First European settlement in Georgia
- 1732** Georgia colony created to extend from the Atlantic Ocean to the Pacific Ocean
- 1736** Augusta becomes the first settlement on Georgia's Fall Line
- 1766** Georgia clay shipped to Wedgwood pottery factory in England
- 1777** First eight counties in Georgia are created
- 1783** Georgia's western boundary is fixed at the Mississippi River
- 1800** Georgia's population of 162,686 almost doubles the results of the 1790 census
- 1829** Georgia's gold rush begins
- 1838** Removal of last Cherokees from Georgia
- 1860** State population surpasses 1 million
- 1868** Georgia capital moved to Atlanta
- 1893** Georgia's most deadly hurricane hits Savannah
- 1900** State population exceeds 2 million
- 1922** Lincoln Memorial statue of Georgia marble dedicated
- 1940** Record set for coldest temperature in Georgia, -17°F
- 1952** Record set for highest temperature in Georgia, 112°F
- 1957** Lake Lanier, one of Georgia's most popular lakes created
- 1967** All of Georgia placed in Eastern Time Zone
- 1972** Cumberland Island National Seashore established
- 1996** Over 5 million spectators attend Summer Olympic Games in Atlanta
- 2000** State population grows to over 8 million
- 2003** Sidney Lanier Bridge, Georgia's longest, opens at Brunswick

Chapter 1 Foreword

Georgia Standards of Excellence
Correlations ▼

SS8G1

Chapter Outline

What Is Geography?

What You Need to Know about Geography

A Look at Georgia's Location

Relative Location

Absolute Location

Using Circle Measurements

Using Latitude to Find North and South

Using Longitude to Find East and West

Using Latitude and Longitude

Finding Location from Satellites in Space

Regions of the World: Where Does Georgia Fit In?

Geographic Regions

Political Regions

Population Regions

SS8G1

Describe Georgia's geography and climate.

- a. Locate Georgia in relation to region, nation, continent, and hemispheres.

AT FIRST GLANCE

This chapter introduces students to geography and why it is important. Basic geographic skills are introduced and reinforced—relative and absolute location, using circle measurements, and reading and understanding maps. The concept of Georgia as a member of multiple regions is explained.

Let's Talk Geography

[What is Geography?](#)

[A Look at Georgia's Location](#)

[Regions of the World: Where Does Georgia Fit In?](#)

To understand Georgia, you need to know something about its geography. For instance, did you know that:

- England believed that Georgia could produce silk?
- Oranges, grapefruit, and bananas don't grow in Georgia?
- The Blue Ridge Mountains affected the early settlement of Georgia?
- Most drinking water in north Georgia comes from rivers and lakes, rather than from wells?
- Georgia's population is growing at a much faster rate than most states?
- Georgia's past, present, and future cannot be explained without a knowledge of everything around us. That is why we need geography.



Ten feet taller than Niagara Falls, Toccoa Falls is one of Georgia's most dramatic waterfalls. The popular scenic site is found on the campus of Toccoa Falls College in Toccoa, Georgia.

CHAPTER 1

What is Geography?

The term **geography**¹ comes from two Greek words— “ge” for *earth* and “graphia” for *write about*. Geographers study physical and cultural features on or near the earth’s surface. **Physical features**² are those that occur naturally, such as mountains, rivers, and oceans. **Cultural features**³ are those created by people, such as boundaries, towns, and roads. Geographers also look at living things— plants, animals, and people. They want to know how people shape and are shaped by their **environment**⁴ — all the things that surround us.

Geography, then, is the study of the earth in a way that shows the relationship between humans and their environment. That makes geography a story of people, places, and relationships.

By remembering this, you will discover that many events in Georgia history did not just happen by chance. Rather, they involved people reacting to their physical

surroundings. Geography is a tool that will help you interpret the past, understand the present, and prepare for the future.

WHAT YOU NEED TO KNOW ABOUT GEOGRAPHY

When geographers tell us about the earth, they often use five basic themes of geography:

- 1 Location:** where places are located on the earth’s surface
- 2 Place:** physical and human characteristics of places
- 3 Relationships:** interaction of people and environment
- 4 Movement:** movement and interaction of people
- 5 Regions:** areas with similar characteristics



▲ Geographers have named the imaginary grid of lines covering the earth “latitude” and “longitude.” Using these lines, we can pinpoint the exact location of any place on the earth’s surface. All we must know are two things: **(1)** how far north or south it is from the Equator, and **(2)** how far east or west it is from Greenwich, England. You will soon find out why these two sites are important to location.

In the following pages, you will be introduced to these concepts and to some important skills of geography. In later chapters, these concepts and skills will be applied to show the many ways geography has influenced Georgia. As you read, keep in mind: *people*, *places*, and *relationships*. That's what geography is all about! ■

LOCATING *the* MAIN IDEAS

- 1 Define:** geography, physical feature, cultural feature, environment
 - 2** Explain why geography is about people, places, and relationships.
 - 3** How does the study of geography relate to Georgia history?
-

Vocabulary

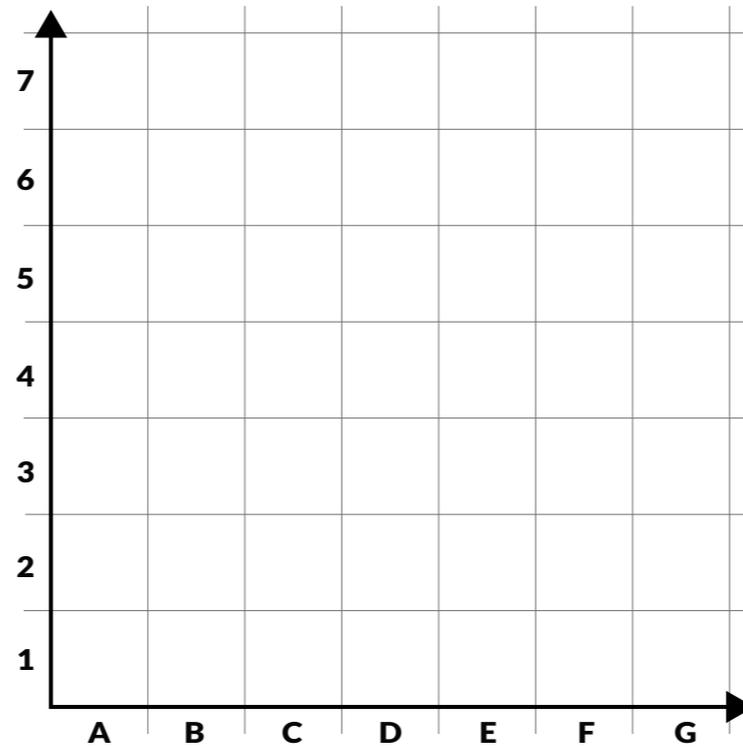
- 1 Geography** - The study of the earth's physical features and how they relate to living things.
- 2 Physical features** - Natural features on the earth, such as mountains, rivers, and oceans.
- 3 Cultural features** - Features on the earth created by people, such as boundaries, towns, and roads.
- 4 Environment** - All the things that surround us.

A Look at Georgia's Location

If you were sending an e-mail to a student in another country, how would you describe Georgia's location? There are many ways it can be done. If you have ever given directions, you are already familiar with some of them.

RELATIVE LOCATION

Relative location¹ refers to the position of one place in relation to another. For instance, Savannah is nearer the ocean than is Columbus. A good way to express relative location is by using **cardinal**² and **intermediate**³ directions. Cardinal directions are the four main direction points on a compass—north, south, east, and west. Intermediate directions are the halfway points between cardinal directions, such as NE (northeast) or SW (southwest).



ABSOLUTE LOCATION

A second type of location is **absolute location**⁴, which refers to the exact spot on the earth's surface where a place is found. Unlike relative location, each place on earth has only one absolute location. Each place's location is unique, that is, different from that of every other place.

Geographers long ago invented a **grid**⁵—or network—of invisible lines to cover

◀ A **coordinate grid** is used to determine the position of a point or other geometric element.

the globe and help them locate places. If you have ever drawn a graph, you are familiar with the grid. It is a set of horizontal rows and vertical columns. Placing a series of rows over a series of columns makes a grid. The point where a row and column cross is known as an *intersection*. The letters or numbers that identify this point are called the coordinates⁶ of the intersection.

The imaginary grid of lines used to determine absolute location consists of *latitude* and *longitude*. You'll find out more about these two terms shortly.

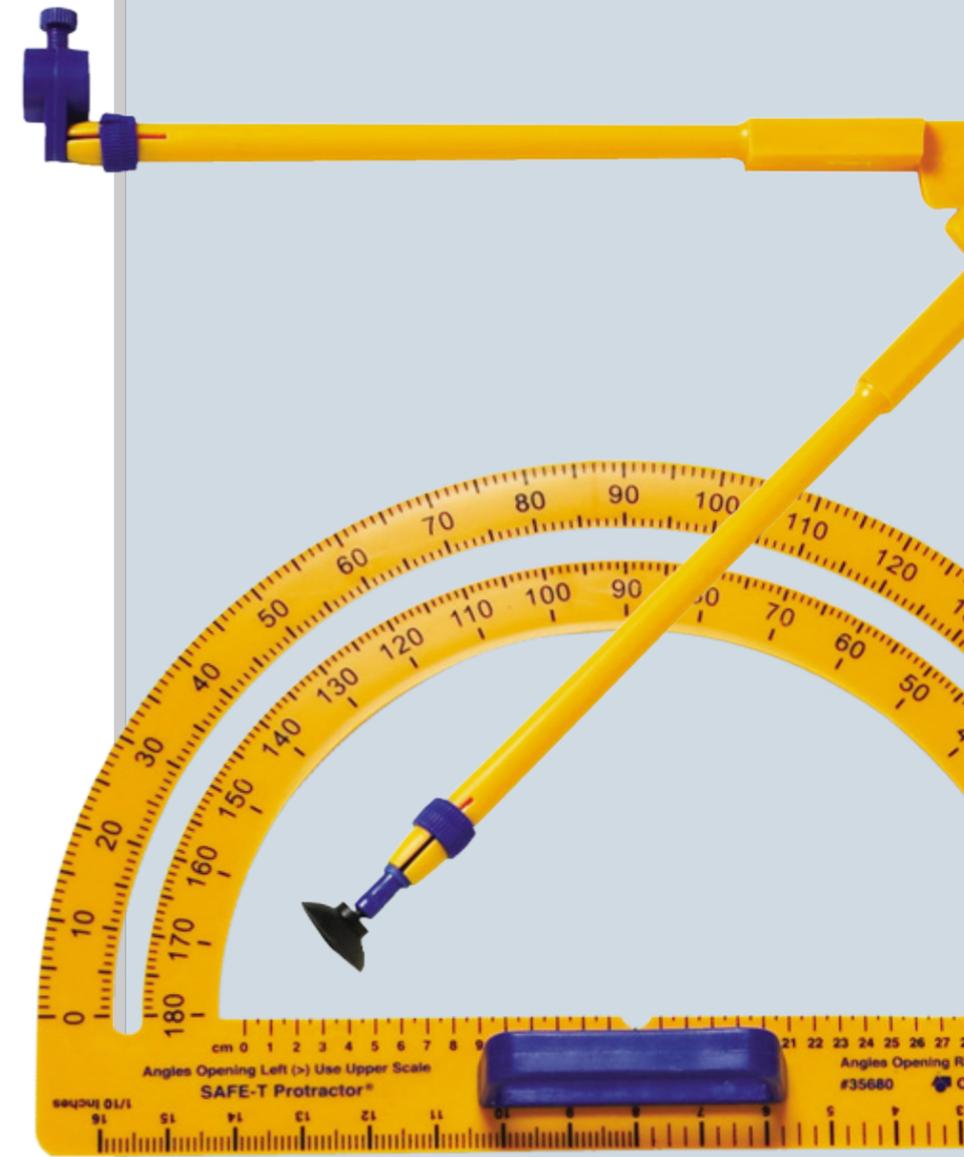
USING CIRCLE MEASUREMENTS

The grid formed by latitude and longitude is special because the earth is round, like a circle. Ancient mathematicians developed a system for dividing a circle into 360 small, equal divisions called degrees⁷. One degree—written as 1° —equals $1/360$

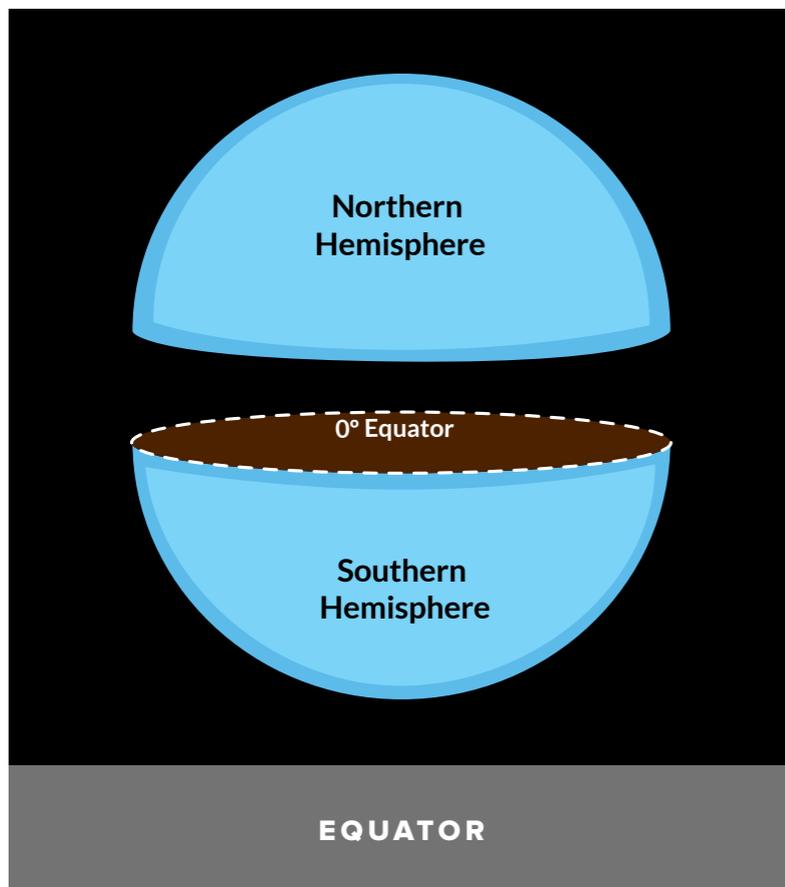
of a full circle. Degrees are further divided into smaller units called minutes⁸. Just as an hour has 60 minutes, 1 degree has 60 minutes (written $1^\circ = 60'$). Minutes are divided into the smallest parts of a circle, called seconds⁹ (written as $1' = 60''$).

Degrees, minutes, and seconds allow us to identify the exact location of any place on the edge of a circle. Since there are 360 degrees in a circle and 60 minutes in each degree and 60 seconds in each minute, we can divide a circle into over 1 million different parts ($360 \times 60 \times 60 = 1,296,000$). Because we usually don't need to be that exact, you will sometimes see minutes and seconds rounded off. Remember, there are 60—not 100—parts to each degree and minute. For instance, $33^\circ 28' 47''$ would be rounded off to the nearest minute— $33^\circ 29'$.

Although the earth is round, it is not just a circle. It is a round body called a sphere¹⁰. Every point on its surface is the same



distance from its center. This makes it possible to measure the Earth in degrees, just like a circle. ■



USING LATITUDE TO FIND NORTH AND SOUTH

Latitude¹¹ lines are used to determine location north and south from the

Equator¹², an imaginary line that circles the earth at its widest part.

To calculate latitude, four reference points on earth are used. At the opposite ends of the earth are two geographic points—the North Pole and the South Pole. They are the opposite ends of an imaginary line called the Earth's **axis**¹³, around which our planet turns. Halfway between the two poles lies another imaginary line which divides the world in two. This is the Equator. The fourth reference point is the center of the earth.

The drawing on this page shows how latitude is measured. The starting point for measuring latitude— 0° —is the Equator. The angle made if one line is drawn from the center of the earth to the Equator and another line from the center of the earth to the North Pole is 90° —a right angle. The same is true with the South Pole—another 90 degree angle. Therefore, the latitude of each pole is said to be 90° . The North Pole's latitude is 90 degrees *north*—stated

LOCATING *the* MAIN IDEAS

- 1 **Define:** relative location, cardinal direction, intermediate direction, absolute location, grid, coordinate, degree, minute, second, sphere
- 2 Describe Georgia's relative location to its border states.
- 3 Explain why your street address is one type of absolute location.
- 4 Draw a grid with five rows and five columns. Label the rows using numbers. Label the columns using letters. Mark points at two different intersections, and give the coordinates for both points.

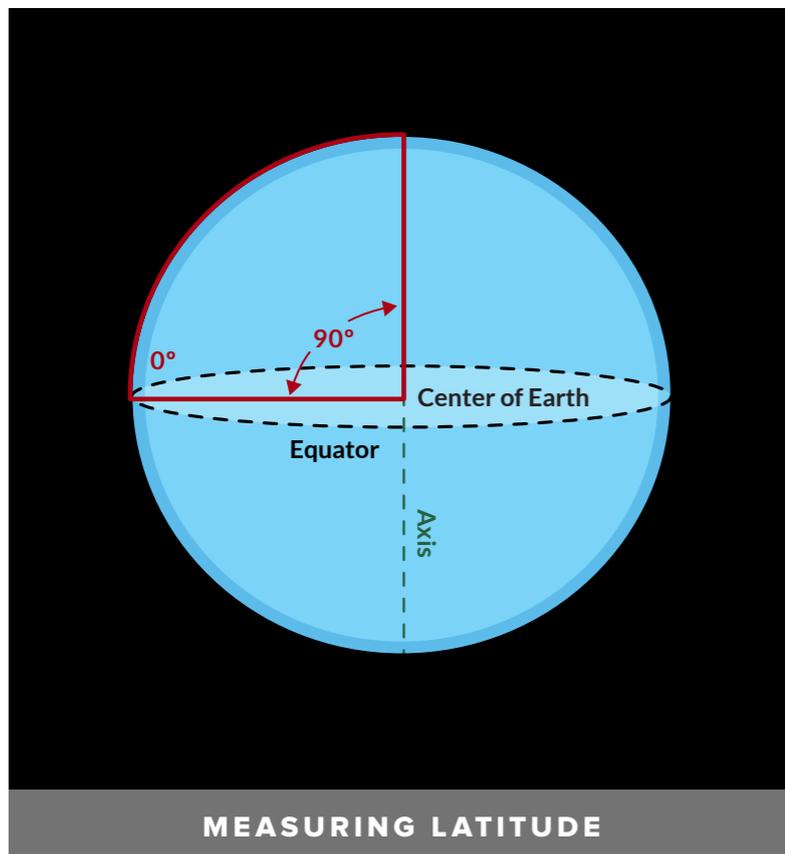
as 90°N. The latitude of the South Pole is 90 degrees *south*, or 90°S. Because of this, the latitude of any location on earth must be between 0 and 90 degrees north, or between 0 and 90 degrees south, depending upon whether it is north or south of the Equator. The Equator thus divides the Earth into two halves, known as **hemispheres**¹⁴. The northern half is

called the Northern Hemisphere, and the southern half is the Southern Hemisphere. If you look at a world map or globe, you can see that Georgia is located in the Northern Hemisphere.

Lines of latitude are sometimes called **parallels**¹⁵. That is because *latitude* lines are *parallel*—they never cross, always remaining the same distance from each other. So, the “35th parallel” is the line that circles the globe marking 35 degrees of latitude.

The average distance between degrees of latitude is 69.06 miles. Minutes are just over one mile apart (6,077 feet), and seconds are 101 feet apart.

But latitude is only one-half of geography’s grid system for determining location on earth. For example, Atlanta, Georgia’s state capital, is situated at 33°45’N. But so are Ragland, Alabama; West Point, Mississippi; and many other places in the United States. In fact, 33°45’ crosses



Lebanon, Iraq, Iran, Afghanistan, China, Japan, and several other countries of the world. What piece of information is missing? Latitude allows us to find location north and south of the Equator, but it doesn't help us on east and west. That's the story of longitude.

USING LONGITUDE TO FIND EAST AND WEST

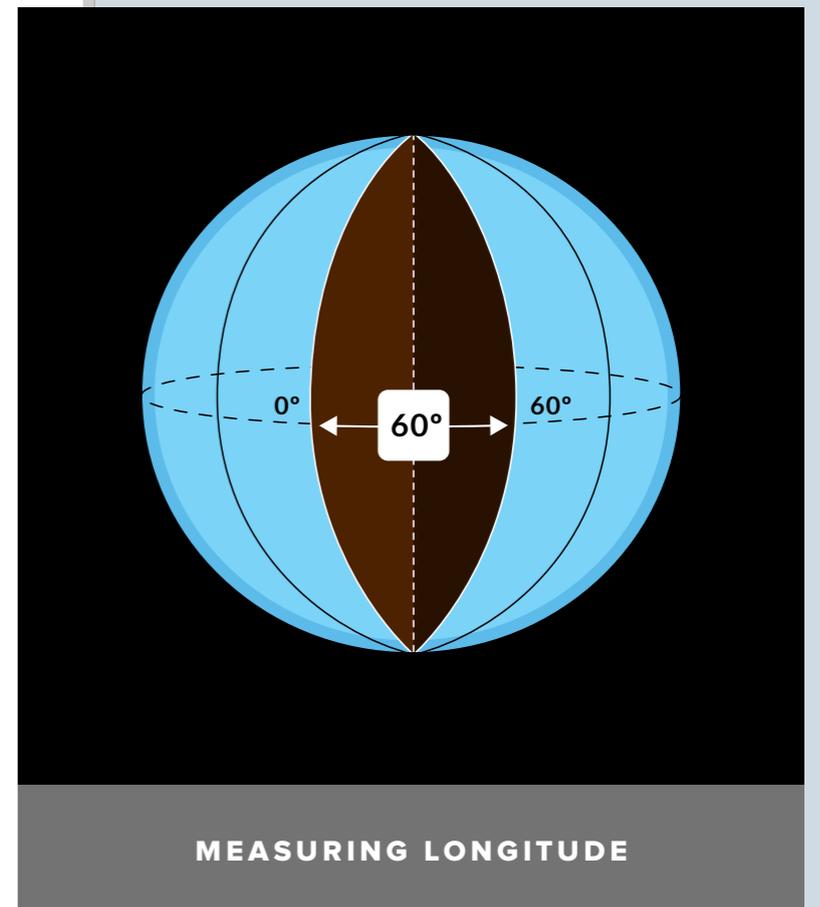
Long ago, ocean navigators learned to use latitude to determine north and south. Halfway between the poles was a natural reference point for dividing north from south—the Equator. At night, they used the North Star to find north. But measuring east and west was not as easy.

The term for measuring east and west location is **longitude**¹⁶. Just like latitude, longitude is measured in degrees. The degrees represent the angle between two lines from the center of the earth—

one to 0° longitude and the other to the place you are trying to locate. But where should 0° longitude be located? Unlike latitude, which has the Equator, there is no natural point on earth to separate east and west. Zero degrees longitude could be anywhere.

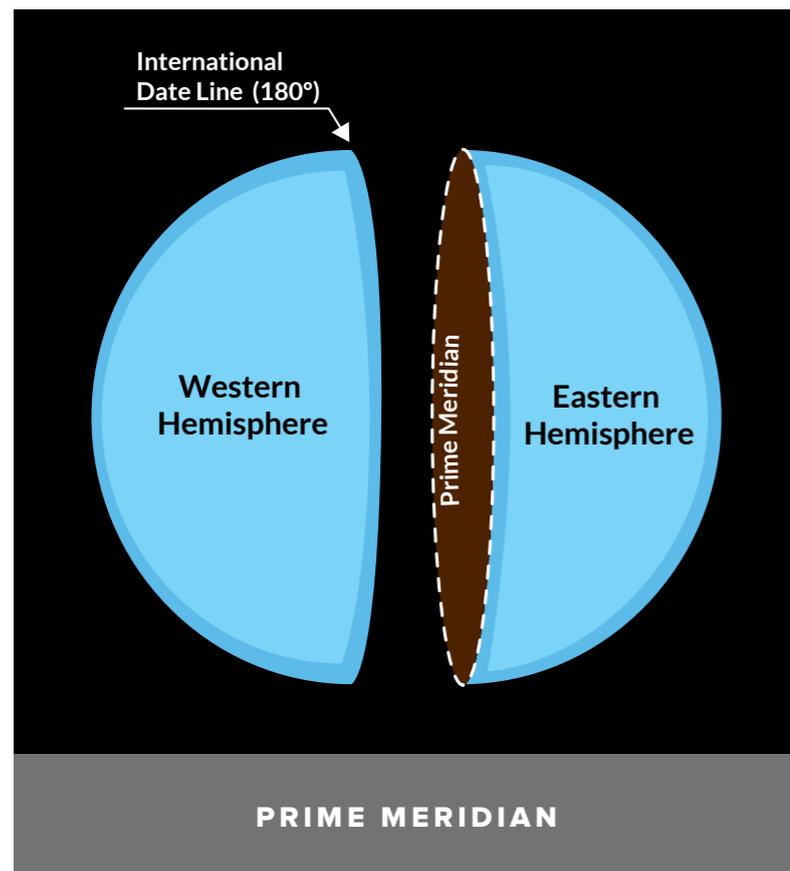
For centuries, each nation was free to decide how it wanted to measure east and west. A common practice for **cartographers**¹⁷—map makers—was to select their own nation's capital city or a major port as 0° longitude. You can imagine how confusing this must have been.

The problem was finally solved in 1884, at an international meeting in Washington, D.C. There an agreement was made that Greenwich, England, just outside London, would be 0°—the beginning point of world longitude. Greenwich was chosen for several reasons.



MEASURING LONGITUDE

Atop a hill in Greenwich stood the Royal Observatory. For some time, detailed navigation tables had been prepared here, with the observatory serving as 0° longitude. Also, at that time Britain was the world's leading sea power, and it made sense to follow its lead.



From the Royal Observatory, a line was extended to the North and South poles.

This was the first of 360 north-to-south lines connecting the two poles. They were called **meridians**¹⁸. Because Greenwich's meridian marked the point from which all other longitude was measured, it was named the **Prime Meridian**¹⁹.

The Prime Meridian marks the dividing point between the Western Hemisphere and the Eastern Hemisphere. Because the earth is a sphere, a second dividing point is needed halfway on the other side of the world. That point is longitude 180°—half of 360°. The 180th meridian not only divides east from west. It also marks the beginning point for counting time and dates on earth and is known as the **International Date Line**²⁰. If you trace the Prime Meridian up to the North Pole, you will notice that it simply changes its name to International Date Line on the other side of the pole. Observe that 0° and 180° form one continuous line dividing the earth into Eastern and Western hemispheres.

To identify other longitudes, you must indicate whether they are east or west of Greenwich. The 81st meridian in the Western Hemisphere—which crosses through Savannah, Georgia—would be shown as 81°W. In the Eastern Hemisphere, 81 degrees of longitude would be indicated as 81°E.

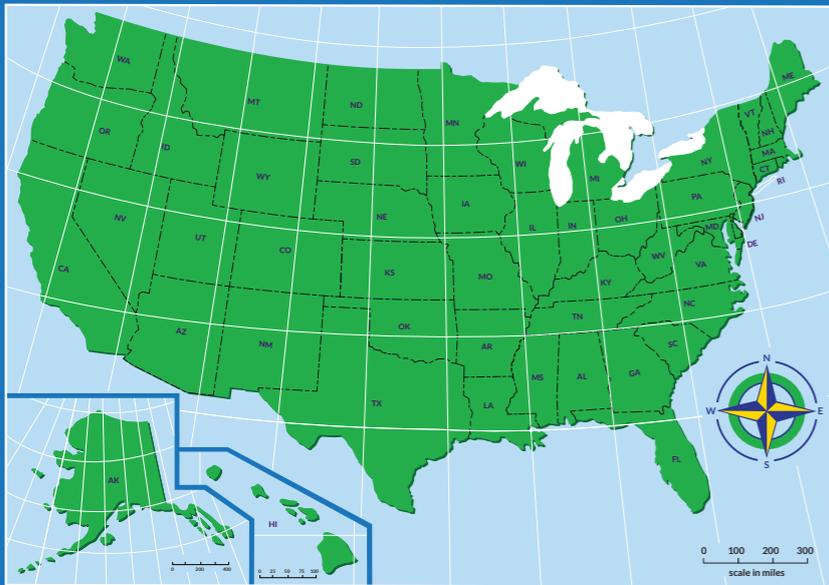
Notice that unlike parallels of latitude, which never cross, meridians of longitude converge—or meet—at the two poles. Distance between meridians is greatest at the Equator—69.17 miles. At Georgia's southern border, meridians are 59.7 miles apart. By the time they reach the northern border, they've narrowed by another three full miles.

LONGITUDE'S SPECIAL FUNCTION

One special way longitude affects each of us is in telling time. A day consists of 24 hours—the length of time the earth takes



to complete rotation on its axis. There are 360 degrees of longitude, and it takes one hour for the earth to rotate 15 degrees (360° divided by 24 hours = 15° per hour). The world has been divided into 24 **time zones**²¹ about 15 degrees apart. These zones don't always follow every 15th meridian. A state, province, or country may want all of its people following the same time. However, larger countries like the United States, Canada, and Australia have no choice but to divide into different time periods.



The United States has a total of six different time zones. Georgia is situated in the Eastern Time Zone. As you go west, you turn your clock back one hour as you enter each new time zone. As you travel east, you advance your clock ahead one hour for each zone.

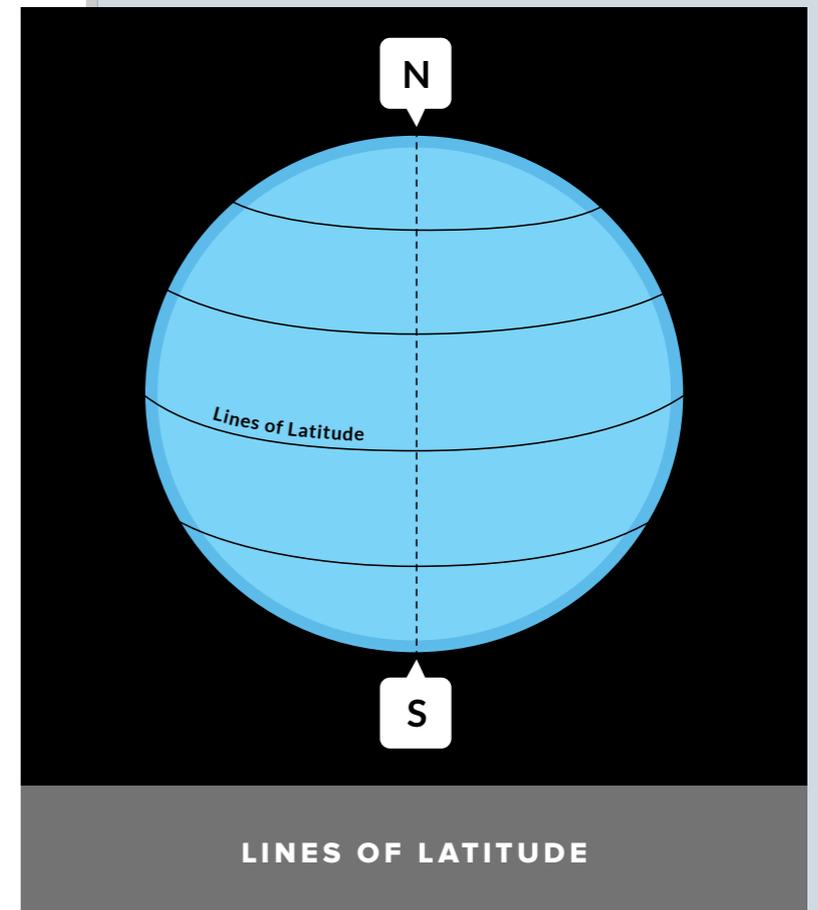
To give you an idea how time works, on December 1, when it is 12 noon in Greenwich, England, it will be 7:00 a.m. in Macon, Georgia, and 4:00 a.m. in Los Angeles, California. Heading east from

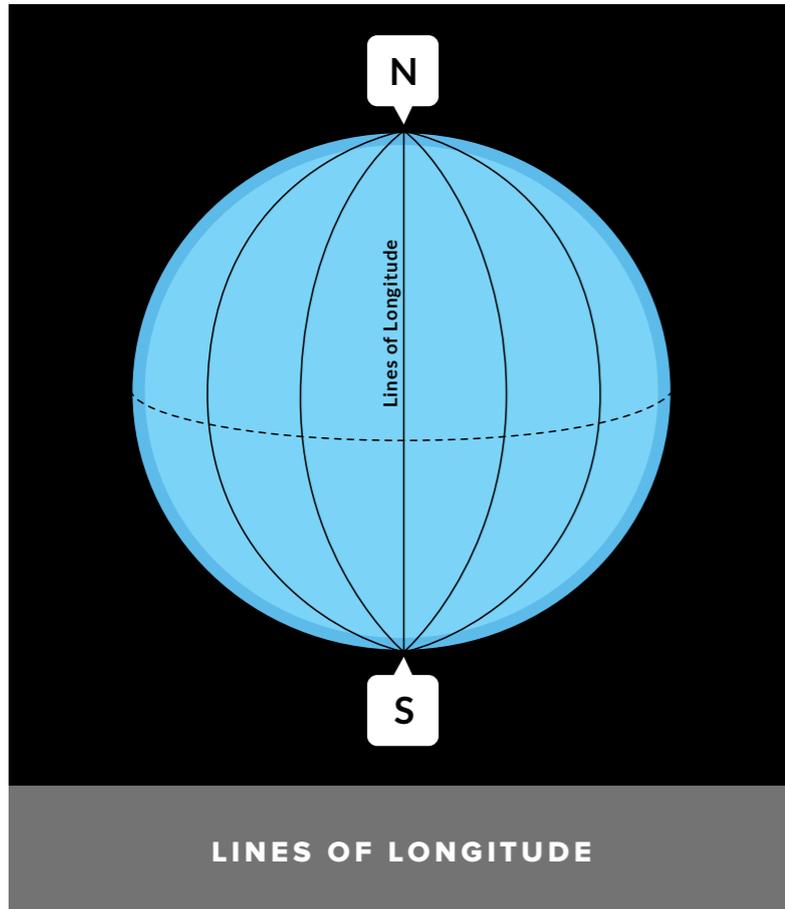
Greenwich, however, you turn the clock ahead one hour every 15 degrees, until you reach the International Date Line. At that point—180°—the clock will have just hit midnight, the dawn of a new day—December 2.

USING LATITUDE AND LONGITUDE

Latitude and longitude are important because they provide a system for determining exact locations. They are important for other reasons, too. Look at the map of the United States and observe the lines of latitude and longitude and many of the state boundaries. A number of states—including Georgia—use latitude or longitude for one or more of their boundaries. Except for New Jersey and Hawaii, every state has one or more of its boundaries based on latitude, longitude, or both. Notice how this is especially true of the western states, which were settled last.

◀ **Latitude** and **longitude** are used to form one or more boundaries of almost every state.





Why were latitude and longitude used so often in America for political boundaries? When England began creating new colonies in America, little was known about the geography of the country. Rather than worry about rivers and mountain ranges, the British government found it convenient to “colonize by latitude.”

FINDING LOCATION FROM SATELLITES IN SPACE

For centuries, knowledge of latitude and longitude has been important to pilots, navigators, cartographers, and surveyors. In recent decades, it has also become important to the military.

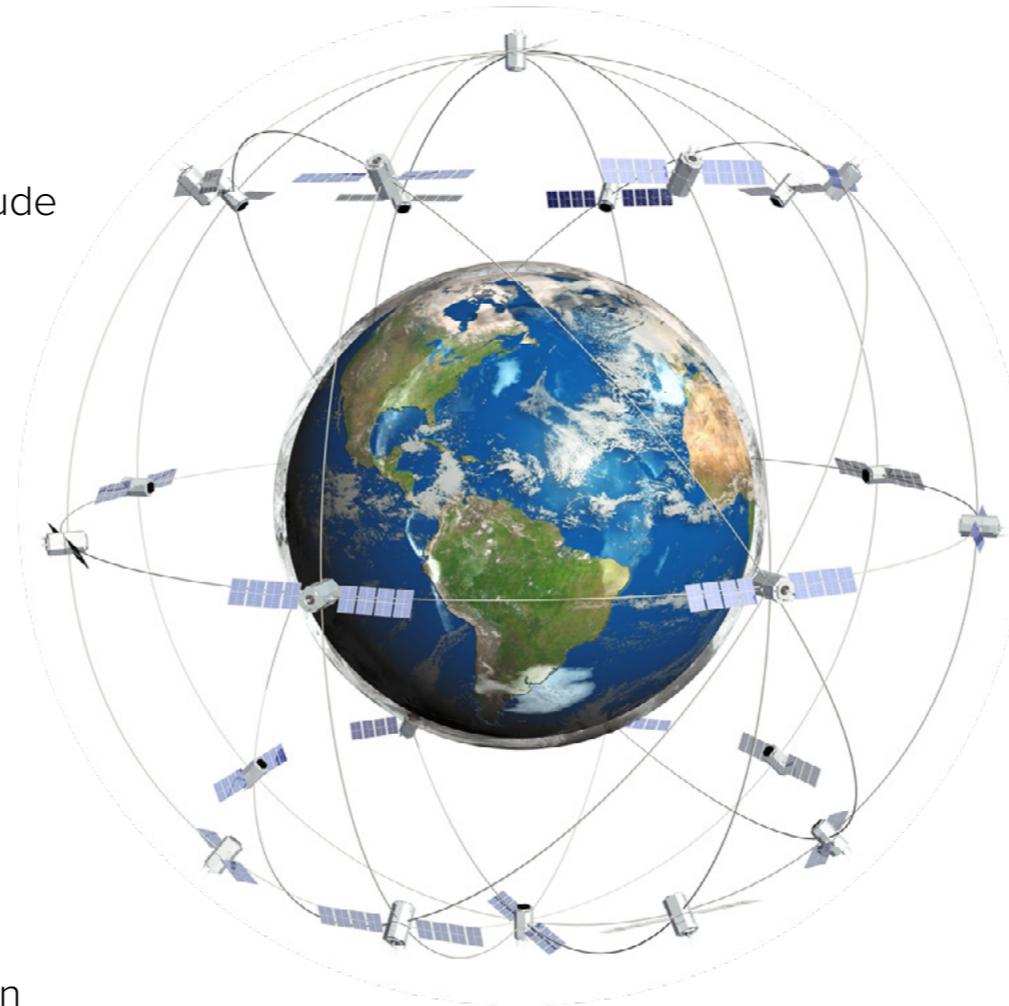
In the 1970s, the U.S. Defense Department developed a new way to determine the exact latitude and longitude of any place on earth. Known as the Global Positioning System, or GPS, the new technology originally was intended for military uses such as “smart bombs.” But by the 1980s, the GPS was made available to everyone.

GPS depends on a network of 24 satellites constantly circling the globe at a height of 12,000 miles. The satellites are solar powered and continuously send out radio signals. Because of the network of orbits, at any one time signals come in from at least four different satellites. GPS receivers

are able to process the differences in radio signals and identify the exact latitude and longitude of the receiver.

GPS technology is now being applied to our daily lives. For example, many new cars come equipped with GPS systems that help drivers determine their location and display maps showing how to get to their destination. GPS is an important tool for firefighters, police, emergency medical technicians, and people delivering everything from packages to pizzas. The technology has even found recreational uses in a locational sport known as geocaching, in which participants use a GPS receiver to find hidden items.

The system that once was important primarily to sailing ships has now found a place in everyone's daily life—and it's all based on latitude and longitude. ■



▲ A **satellite** is an artificial object which has been intentionally placed into orbit. Common types include military and civilian Earth observation satellites, communications satellites, navigation satellites, weather satellites, and research satellites.

LOCATING *the* MAIN IDEAS

- 1 **Define:** latitude, Equator, axis, hemisphere, parallels, longitude, cartographer, meridian, Prime Meridian, International Date Line, time zone
- 2 What are the four reference points needed to calculate latitude?
- 3 What is the starting point for measuring latitude? longitude?
- 4 What directions does latitude measure? longitude?
- 5 How have latitude and longitude been important in U.S. history?

Vocabulary

- 1 **Relative location** - The position of one place in relation to another.
- 2 **Cardinal directions** - Four main direction points on a compass: north, south, east, and west.
- 3 **Absolute location** - The exact spot on the earth's surface where a place is found.
- 4 **Intermediate directions** - The halfway points between cardinal directions: northwest (NW), northeast (NE), southwest (SW), and southeast (SE).
- 5 **Grid** - A series of rows placed over a series of columns used to help locate places.
- 6 **Coordinates** - Letters or numbers used to identify location on a grid.
- 7 **Degrees** - The 360 equal divisions of a circle. Degrees are used for measuring latitude and longitude.
- 8 **Minutes** - The 60 equal divisions that make up one degree of a circle.
- 9 **Seconds** - The 60 equal units that make up a minute of a circle.
- 10 **Sphere** - A round body, such as the earth, on which every point of the surface is the same distance from its center.
- 11 **Latitude** - The parallel lines that determine location from 0° to 90° north and south of the Equator.
- 12 **Equator** - Imaginary line that circles the earth at its widest part and divides the earth into the northern and southern hemispheres.
- 13 **Axis** - 1: The imaginary straight line through the earth from pole to pole around which the earth rotates. 2: Name given Germany, Italy, Japan, and their allies in World War II.

- 14 **Hemisphere** - Any half of the earth based on either north and south, or east and west. The Equator divides the earth into northern and southern hemispheres, while the Prime Meridian/International Date Line separates the eastern and western hemispheres.
- 15 **Parallels** - Another name for lines of latitude.
- 16 **Longitude** - The lines that determine location from 0° to 180° east and west of the Prime Meridian.
- 17 **Cartographer** - A mapmaker.
- 18 **Meridians** - Another name for lines of longitude, which extend around the earth from pole to pole.
- 19 **Prime Meridian** - The meridian (0° longitude) that runs through Greenwich, England, from which all other longitude is measured.
- 20 **International Date Line** - The 180° meridian halfway around the world from the Prime Meridian. It marks the starting point for counting time on earth.
- 21 **Time zone** - One of 24 divisions of the earth used for measuring time. Each division marks the approximate distance that the earth rotates in one hour.

Regions of the World: Where Does Georgia Fit In?

Appalachia, the South, the Coastal Plain, and Metropolitan Atlanta—what do these terms have in common? Each is a **region**¹ of the earth. Region is a term geographers use to describe an area of the earth that is alike in ways that make it distinct from other areas of the earth.

Where are Appalachia, the South, the Coastal Plain, and Metropolitan Atlanta located? These regions are not marked on many maps. That's because a region does not have exact boundaries. The concept of region is somewhat like the idea of hot and cold. Although we can measure temperature with a thermometer, where is the exact boundary between “hot” and “cold”?

Although geographers may have difficulty identifying the exact boundaries of a region, they usually can agree on its general location. In some cases, to make their work easier, they will use existing political boundaries—such as county or state lines—to mark off a region.

An example of a region you may be familiar with is your local neighborhood. If you were to ask the people living around you about the boundaries of your neighborhood, you



◀ This satellite image of Earth shows the continents of North and South America. Can you find Georgia's location? What two oceans are visible in this view?

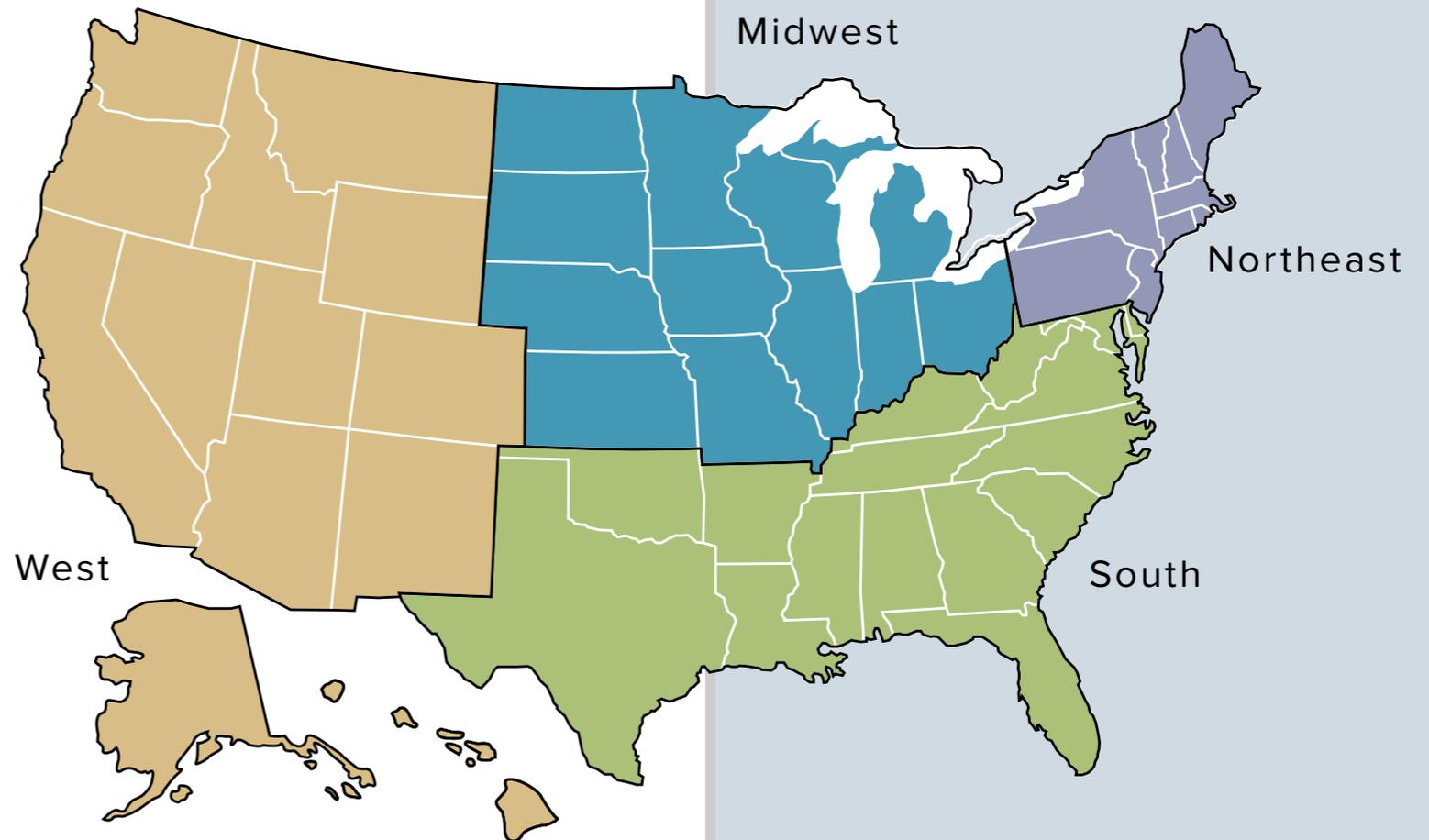
would probably get different responses. But, even if they couldn't agree, you would still have a pretty good idea about the area that makes up your neighborhood. You would know what it's like to live there and how it's similar to or different from other neighborhoods.

The key to a region is *shared characteristics* that make that area unique—different from other areas. A region can be any size—from classroom to community to continent to hemisphere—and may have many or few things in common. But to be called a region, it must have a set of distinct features

GEOGRAPHIC REGIONS

There are hundreds of ways to classify the earth into regions. Any place on earth can be part of many different regions. These regions, however, do not have official boundaries set by government. They are

called regions because of similarities found within them. These similarities may be *physical* in nature—such as location, soil, terrain, elevation, climate, and vegetation. Or they may be *cultural* in nature, such as race, language, history, and standard of living. When a region is identified on the basis of physical or



GEOGRAPHIC REGIONS

cultural features, we call it a **geographic region**². Let's look at several types of geographic regions of which Georgia is a part.

One type of geographic region is that based on *absolute location* on the globe. This involves using latitude and longitude to determine a region's exact location on the earth. Examples of this include dividing the world into hemispheres and time zones.

Another type of geographic region is based on *continental location*. Georgia is located on the continent of North America. The part of North America south of Mexico is commonly called *Central America*. The region from Mexico southward to the tip of South America is known as *Latin America*.

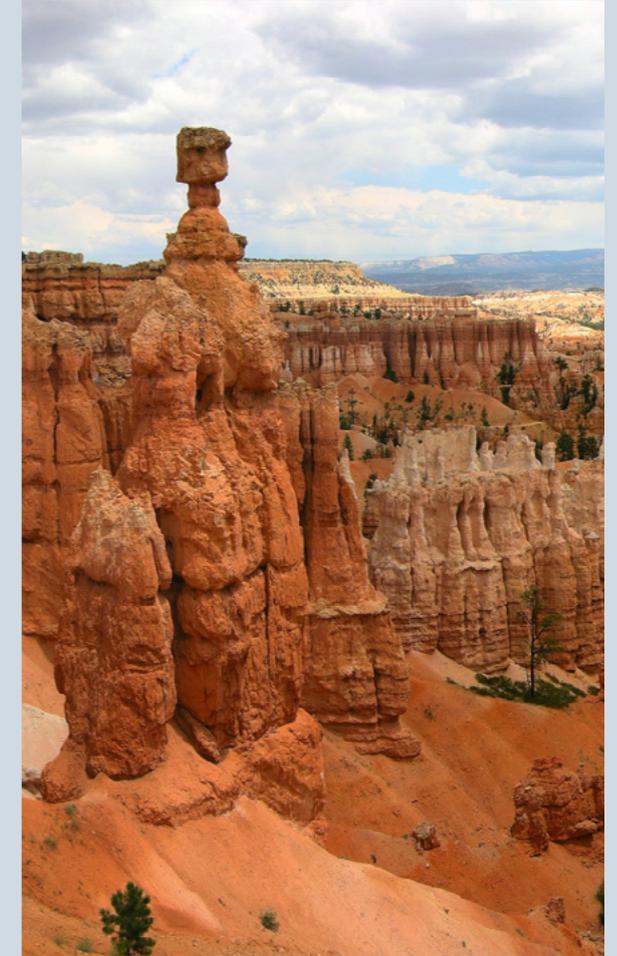
Regions may also be defined according to their *relative location*, which simply means the location of one area in relation to another. A good example of this is

the division of the United States into the North, South, East, and West.

THE SOUTH

In 1763, Charles Mason and Jeremiah Dixon were called upon to survey the boundary between Pennsylvania and Maryland to settle a disagreement. The results of that survey became known as the Mason-Dixon Line. Later, after Pennsylvania and other northern states outlawed slavery, this line became the dividing line on the East Coast between slave and free states. To many, the Mason-Dixon Line separated the "South" from the "North."

In 1861, 11 slave states broke away from the Union and formed the Confederate States of America (see page 205). These states are considered part of the South. Some geographers enlarge the South to



▲ This scenic photo taken in southern Utah shows one of many different geographic regions in the United States. Even if you didn't know where it was taken, how would you know this isn't Georgia?

include Maryland and Kentucky. The U.S. Census Bureau defines the South as also including West Virginia, Oklahoma, and even Delaware. Whatever definition is used, Georgia is always listed as part of the South.

THE SOUTH

Another regional term you will sometimes see is “Deep South.” While the term involves relative location, it also refers to the heart of the old Confederacy. It was a region that was rural, poor, and dependent upon agriculture—particularly cotton. States in the Deep South had much in common. Usually included as part of the historic “Deep South” are South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and sometimes Arkansas and North Carolina.

THE SOUTHEAST

Georgia is also part of a region known as the “Southeast.” There is no official list of which states make up the southeastern United States, but Georgia is always included. In many ways, Georgia has more in common with neighboring states of the Southeast than with such southern states as Texas and Maryland, or with such eastern states as Maine and New York.

THE SUN BELT

During the 1980s, a new regional term came into use: “Sun Belt.” This term applies to a band across America of southern and western states whose warm climates have attracted Northerners to move there. The Sun Belt has no exact boundary, but 37°N is about where it begins. The states most commonly associated with Sun Belt growth are Florida, North Carolina, Georgia, Texas, Arizona, and California.



▲ Most states in the Southeast border the ocean, and lighthouses historically were important to protect ships from running aground. Georgia once had 15 lighthouses, but today only three remain in operation. At 154 feet in height, the **Tybee Island Lighthouse** is Georgia’s tallest.

POLITICAL REGIONS

In addition to regions based on location, there are other types of regions important to Georgia. A **political region**³ is an area of land that has legal boundaries and has its own government. The best examples of this type of region are your city, county, state, and nation.

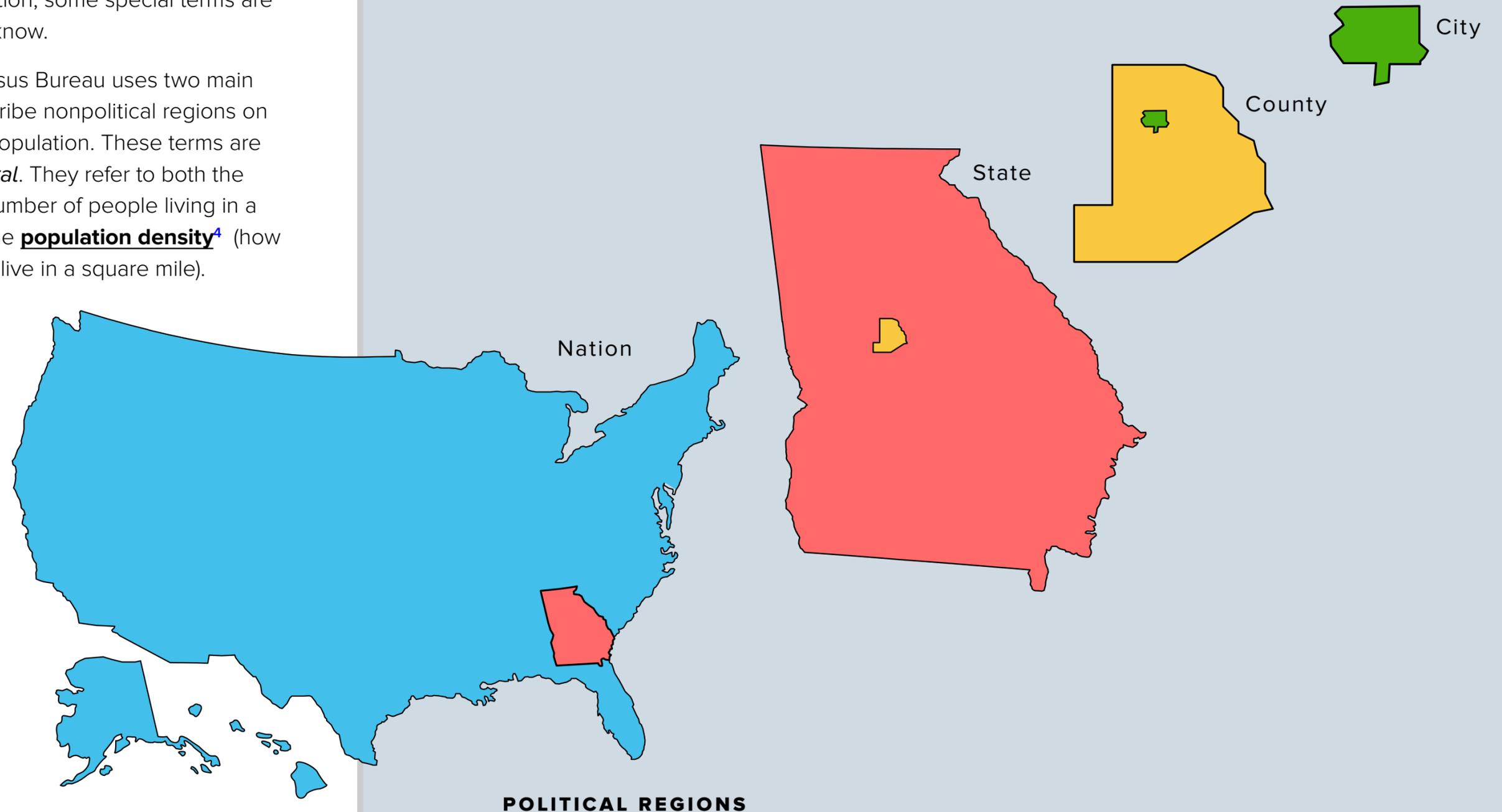
People living in a political region have many things in common. For example, the laws, traditions, and beliefs in Georgia about what services government should provide are different from those in Massachusetts, California, or even neighboring Florida. Likewise, life in rural Echols or Quitman counties is different from life in urban counties, such as Fulton or DeKalb.

POPULATION REGIONS

Georgia is one of the fastest-growing states in the nation, in terms of population. Because of this rapid growth, our state faces many tough challenges. For

example, growth can bring needed jobs to a community, but it can also create serious traffic and pollution problems. To think about population, some special terms are important to know.

The U.S. Census Bureau uses two main terms to describe nonpolitical regions on the basis of population. These terms are *urban* and *rural*. They refer to both the population (number of people living in a region) and the **population density**⁴ (how many people live in a square mile).



POLITICAL REGIONS

URBAN AREAS

The term “urban” comes from the Latin word for city, “urbs.” Even though the terms urban and city are related, they don’t mean exactly the same thing. The term city describes a politically defined area. The terms *urban* and *urban area* describe areas based on population.

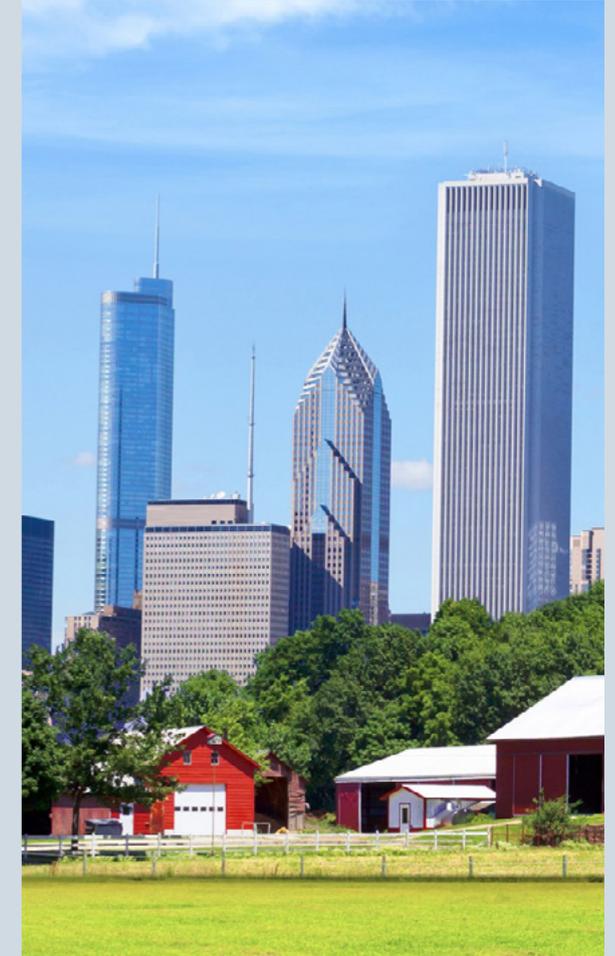
The Census Bureau defines **urban**⁵ as (1) any city with a population of at least 2,500 or (2) any **urbanized area**⁶ of at least 50,000 residents. An urbanized area includes a central space together with a densely settled *urban fringe* next to it. It must have a combined population of at least 50,000. The “central space” may be a city, but not necessarily. An urban fringe is an area with at least 1,000 people per square mile.

Related to urban is the term **suburban**⁷, a word used to describe the heavily

populated residential areas around cities. Suburb comes from a Latin word meaning “near the city.” Sometimes suburbs are called bedroom communities because residents sleep there at night, but in the day they **commute**⁸ (travel back and forth) to work or shop in the city.

RURAL AREAS

When you think of rural Georgia, you probably think of farms or forests. But you can find rural areas within 20 miles of downtown Atlanta! What makes an area rural? The Census Bureau says that any place not meeting the definition of urban or urbanized area is considered **rural**⁹. This means that any Georgia town or community with fewer than 2,500 residents is classified as rural. Likewise, any area outside a city with fewer than 1,000 people per square mile would be considered rural.



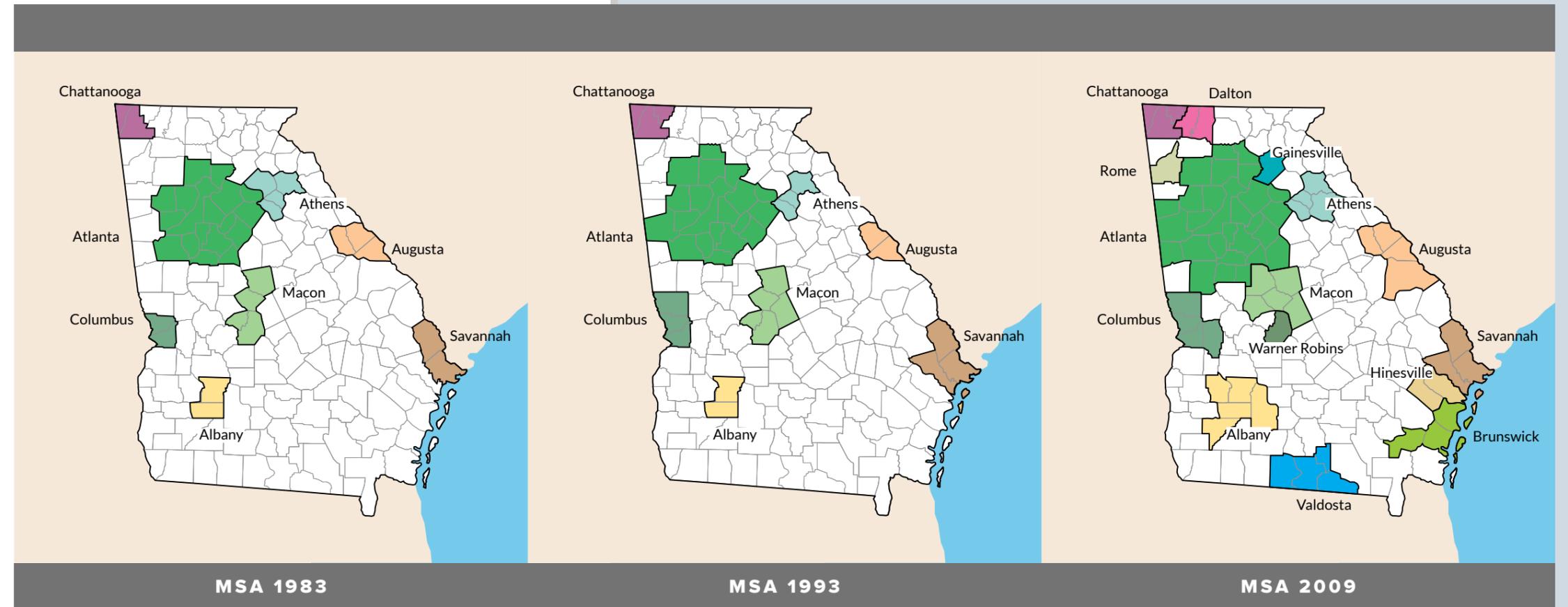
Urban vs. Rural

METRO AREAS

One special type of area related to population is called a **Metropolitan Statistical Area (MSA)**¹⁰. TV news shows sometimes refer to “**metropolitan**¹¹ Atlanta.” The term refers to the city of Atlanta plus the large, populated area surrounding it.

Many federal grant programs (such as housing, crime-fighting, and transportation) apply only to MSAs. These areas receive money to help solve problems related to their dense population. An area is designated an official MSA if it has a central city with 50,000 or more residents. In addition to the central city, an MSA includes the county in which the city is located. Also included are adjacent counties that have a high degree of interaction with the central city.

The federal government has guidelines to decide what counties to include in a



metro area. For example, if 25 percent of a county’s workers commute to the central city of the MSA, that county is included. MSAs always consist of entire counties—even though some portions of outlying counties may actually be rural in nature. That results in some outlying counties being officially classified by the federal government as both rural and metropolitan.

In 2009, the federal government designated 15 metropolitan areas in Georgia. Officially, these 15 metro areas are known as MSAs. The Atlanta MSA is by far the largest in population as well as in geographic size. It has 28 counties and half the population of the entire state. Today, 80 percent of all Georgians—that's

four out of five—live in a metropolitan region. These regions are growing faster than Georgia's nonmetro regions. More than 8 out of every 10 new Georgia residents settle in one of the state's metropolitan areas—most often Atlanta. ■

LOCATING *the* MAIN IDEAS

- 1 **Define:** region, geographic region, political region, population density, urban, urbanized area, suburban, commute, rural, Metropolitan Statistical Area, metropolitan
- 2 **Identify:** Mason-Dixon Line, the South, the Southeast, Sun Belt
- 3 Explain the statement, “people create political regions.”

◀ Everybody talks about the weather, but does anybody ever do anything about it? Find out in our Fast Forward video featuring The Weather Channel. We interview multiple on-air and off-air Weather Channel employees, showing a variety of STEM career opportunities, including meteorologists, radio hosts, designers, and IT personnel.

▶▶ FAST FORWARD



▲ [Transcript](#)

Vocabulary

- 1 Region** - A term used by geographers to describe an area of the earth with shared characteristics that make it different from other areas of the earth.
- 2 Geographic region** - An area of the earth with shared physical or cultural features.
- 3 Political region** - An area of land that has legal boundaries and its own government.
- 4 Population density** - The number of people who live within a unit, such as a square mile, of an area.
- 5 Urban** - Generally, refers to any city or community with at least 2,500 inhabitants. Urban can also refer to a densely settled area with a combined population of 50,000 or more that is located next to a city.
- 6 Urbanized area** - Includes a central space and the densely settled urban fringe next to or around it. The combined population must be at least 50,000.
- 7 Suburban** - Refers to a heavily populated residential area near a large city.
- 8 Commute** - Travel back and forth in order to go to work or to school.
- 9 Rural** - Refers to areas of the countryside with a low population density and not considered urban as defined by the U.S. Census Bureau.
- 10 Metropolitan Statistical Area (MSA)** - A metropolitan region consisting of a central city of at least 50,000 people.
- 11 Metropolitan** - Refers to a large urban area consisting of a central city and communities dependent on that city for jobs, services, shopping, and entertainment.

SKILL ACTIVITY

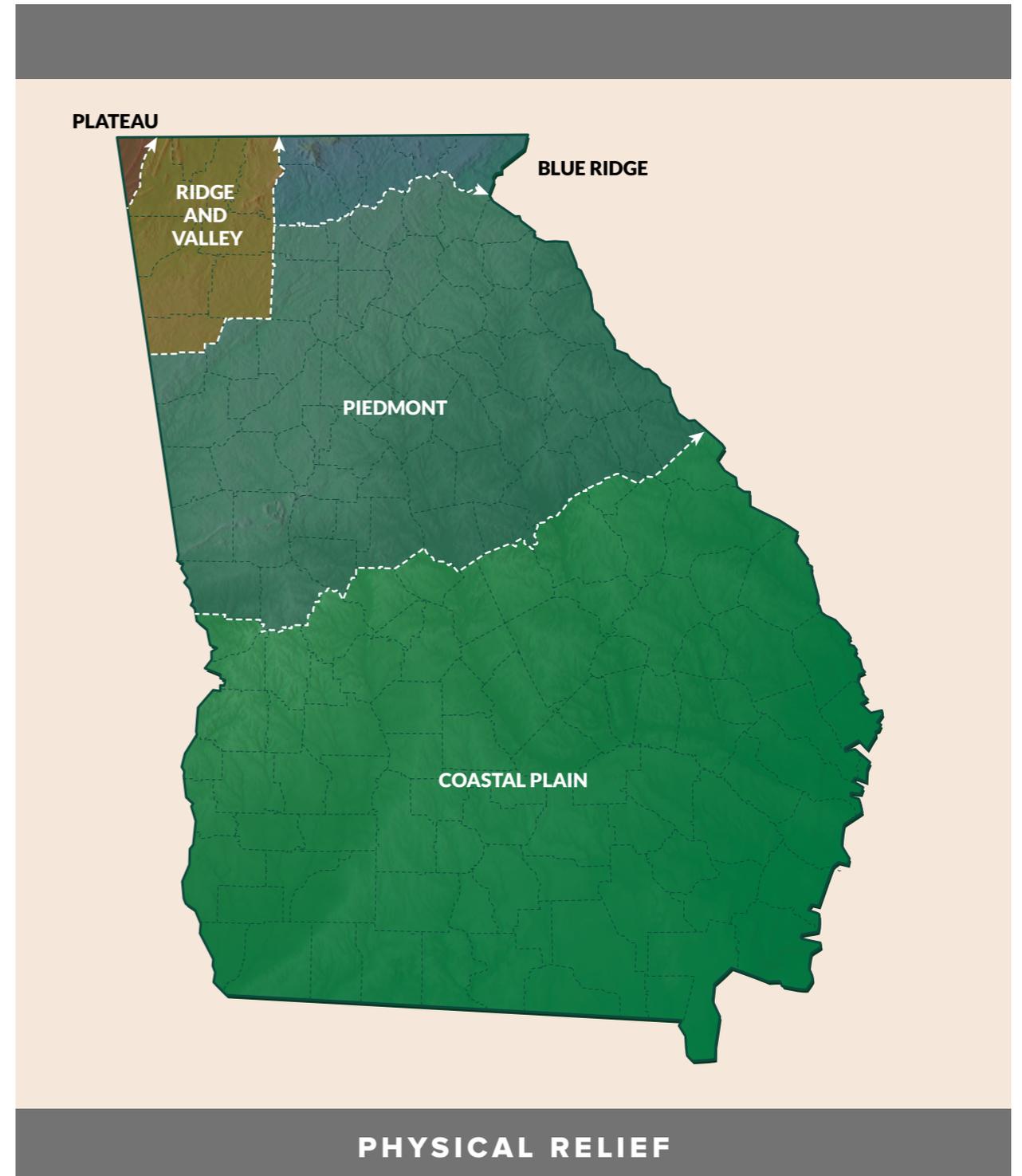
Understanding Maps

A map is a drawing of all or a portion of the earth's surface. There are many types of maps, but generally maps fall into the categories shown below. However, it is possible for a particular map to include a combination of categories. For instance, a highway map may also show the political boundaries of cities and counties.

A **physical relief** map, sometimes called a *physiographic map*, shows land formations such as mountains, hills, rivers, and lakes. Different colors are often used to show elevation. Physical relief maps show how an area would look on a clear day when viewed from high above the earth's surface.

A **political map** shows the boundaries of political regions, such as school or election districts, cities, counties, states, and nations. This map shows the boundaries of Georgia's counties.

A **highway map** shows major roads and highways identified by number and type (such as I-75, U.S. 78, Ga. 53). A highway map also shows the location of cities and towns, major rivers



and lakes, and certain cultural features (such as military bases and state parks).

A **thematic map** (sometimes called a *data map*) shows information based on a theme or topic. The theme can be population, crops, occupation, finances, or whatever you choose to show. Because our government collects data on a county-by-county basis, thematic maps often include county outlines. This map shows where peanuts are grown in Georgia.

PRACTICE YOUR SKILLS

Look through your textbook and find an example of each of the four types of maps described on this page. Write down the chapter number where they are located, identify the type of map, and give a brief description of the map.

Reading Maps

- A. TITLE.** A map should have a title that identifies the subject of the map.
- B. GRID.** The map grid helps you to locate places. A map will usually have an index that identifies place locations by grid coordinates, such as C-4 or A-12. The grid lines generally aren't drawn on the map. The numbers and letters of the rows and columns are written in the margins. To locate places, you must *mentally* connect the grid coordinates and look in the square they form. Not all maps use letters and numbers on a grid. Some use degrees of longitude and latitude—but it all works the same.
- C. SCALE.** A map is a drawing of an actual area. Maps are drawn “to scale,” which means there is a relationship between distances on the map and real distances. A map scale allows you to measure distances on a map to determine the actual distance between places.

The *graphic scale*, which looks like a small ruler, is the most common type of map scale. The “ruler” is divided into units of

measurement, typically miles or kilometers, so you can see how far apart two places on the map actually are. There are other ways to express scale.

A *verbal* or *word scale* is a simple statement of distance, such as “one inch equals ten miles.” A *fraction scale* shows distance as a fraction or ratio, such as 1:500,000. If the map is based on inches, 1 inch on the map would equal 500,000 inches (about eight miles) on earth.

D. LEGEND or KEY. The map **legend**—or **key**—explains the symbols used on the map. The symbols may be small pictures, like a track to represent a railroad or a tree to represent a park. Dots of different sizes usually represent cities of varying populations—the larger the dot, the greater the population. Color is another kind of symbol on a map. Rivers are frequently drawn in blue, while forest areas are shaded green.

E. DIRECTION. A drawing of a **compass rose** showing the cardinal directions, or an arrow pointing north, should appear somewhere on the map. This symbol is important because the top of the page is not always true north.



Source: U.S. Census Bureau, Census 2010

PRACTICE YOUR SKILLS

- 1 Define:** map, scale, legend, key, compass rose
- 2** What is the title of the map on this page?
- 3** What are the coordinates of Augusta? of Columbus?
- 4** What information is given in the map legend? How many cities have a population within the category over 50,000? over 100,000? over 400,000?
- 5** Using the compass rose on this map, are the top of the page and true north the same? ■



CHAPTER 1 QUIZ

Text Version

Chapter 2 Foreword

Georgia Standards of Excellence
Correlations ▼

[SS8G1](#)

Chapter Outline

The Physical Geography of Georgia

Georgia Landforms
Physiographic Regions
Georgia's Coast

Georgia's Natural Resources

Water Resources
Rocks and Minerals
Georgia's Weather and Climate
Air and Ocean Currents

SS8G1

Describe Georgia's geography and climate.

- b. Distinguish among the five geographic regions of Georgia in terms of location, climate, agriculture, and economic contribution.
- c. Locate key physical features of Georgia and explain their importance; include the Fall Line, Okefenokee Swamp, Appalachian Mountains, Chattahoochee and Savannah Rivers, and barrier islands.
- d. Analyze the importance of water in Georgia's historical development and economic growth.



Transcript



Providence Canyon in southwest Georgia is known as Georgia's Little Grand Canyon. Considered one of Georgia's natural wonders, Providence Canyon State Park attracts thousands of visitors each year.

CHAPTER 2

AT FIRST GLANCE

This chapter covers the physical geography of Georgia. Students are introduced to Georgia's varied landscape, including mountains, hills, plains, rivers, lakes, wetlands, the seashore, and barrier islands. The state's five physiographic regions—the Coastal Plain, Piedmont, Blue Ridge, Ridge and Valley, and Plateau—are described. Natural resources, including water and minerals and weather and climate, are covered.

The Land of Georgia

[The Physical Geography of Georgia](#)

[Georgia's Natural Resources](#)

Georgia is a large state. Including land and water area, it takes in approximately 58,900 square miles. That's larger than many countries of the world. At the points of greatest distance between borders, Georgia is 300 miles from north to south and 250 miles east to west. It is the largest state east of the Mississippi River.

When Britain created Georgia in 1732, its boundaries were much different. Then, the colony consisted of all the land between the Savannah and Altamaha rivers, westward all the way to the Pacific Ocean! Later, the Mississippi River became Georgia's western boundary. There were other changes, but by 1802, Georgia looked much as it does today.

The Physical Geography of Georgia

GEORGIA LANDFORMS

Look out your window. Is the land around you flat or hilly? In the distance, do you see tall hills, or maybe even mountains? Depending on where you live, the surface features of Georgia can be quite different. Near the coast, you will see flatlands. In north Georgia, you will see ridges, valleys, and mountains. Nature has produced a wide range of land formations (or **landforms**¹, for short) in Georgia.

Why does Georgia have this variety of landforms? The ocean once covered the southern half of Georgia and wore away most land formations. To the north, the land was shaped by forces beneath the earth's surface and by water erosion. Today, **erosion**²—the wearing away of soil and rock by natural forces, primarily water—is the main natural force affecting Georgia land formations.

MOUNTAINS, HILLS, AND PLAINS

If you want to visit the highest point in Georgia, you will have to go to north Georgia. There, in the Blue Ridge Mountains, is Brasstown Bald, the tallest mountain in the state. On top of the mountain is this sign:

However, if you could measure Brasstown Bald, you would find it is only 2,864 feet high from base to top. This difference can be explained because geographers have two ways of telling how high, or tall, a land formation is.

The **Brasstown Bald Visitor Information Center**, located on the summit, offers exhibits, video presentations, and interpretive programs about the location.



Brasstown Bald, the highest point in Georgia with a height of 4,784 ft.



[Transcript](#)



The most common measurement is **elevation**³, which is height above sea level. The sign on top of Brasstown Bald giving the height of 4,784 feet refers to its elevation above the Atlantic Ocean, which is almost 300 miles away. Even though the mountain is far from the ocean, elevation is important for several reasons. First, temperature generally is related to elevation, dropping an average 3.3°F for each 1,000 feet above sea level. Higher elevations mean milder summers, colder winters, and shorter growing seasons. This directly affects the plant life and the type of crops that can be grown.

Elevation can also influence the amount and form of **precipitation**⁴—water falling to the earth, such as rain and snow. The first tall mountains in the path of moist, warm air currents off an ocean will likely have high rainfall patterns in spring and summer. They will have frequent snowfalls in winter.

Elevation also affects how rivers are formed and how they flow. Because of greater rainfall in higher elevations, some of Georgia's major rivers begin here. Most of the rainfall in the mountains either runs off directly into streams or is absorbed into the ground and then feeds countless springs. These springs are the source of mountain streams, which are pulled by gravity to lower elevations where they join with others to form rivers.

Related to elevation is **relief**⁵, a term for the difference in elevation within a landform (such as the height of a mountain from its base to its peak) or between neighboring landforms. In the case of Brasstown Bald, from base to top,

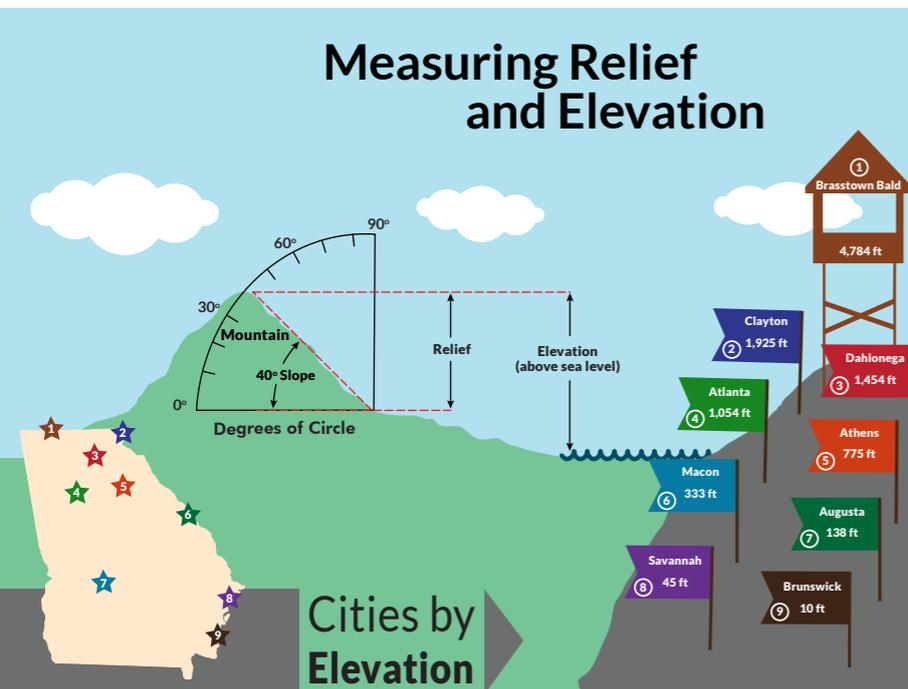
North Georgia offers scenic areas and opportunities for a variety of such outdoor activities as hiking, camping, mountain climbing, and zip-lining.



[Transcript](#)



its relief is 2,864 feet. Stone Mountain, rising over 825 feet from the earth’s surface, is another example of high relief.



Slope⁶ refers to the steepness of a landform and is measured in degrees of a circle. Land with absolutely no incline (0°) is “flat”—or horizontal. A 90° slope would be vertical—or straight up and down—like the side of a building.

Portions of Georgia near the ocean have practically no slope. Most of the southern

half of the state has low relief and flat to gentle slopes. In the northern half of the state you will see a variety of reliefs and slopes—from near flatlands to steep slopes. For the most part, this is an area of rolling hills. Extreme north Georgia, however, has a variety of landforms, including mountains and valleys. ■

PHYSIOGRAPHIC REGIONS

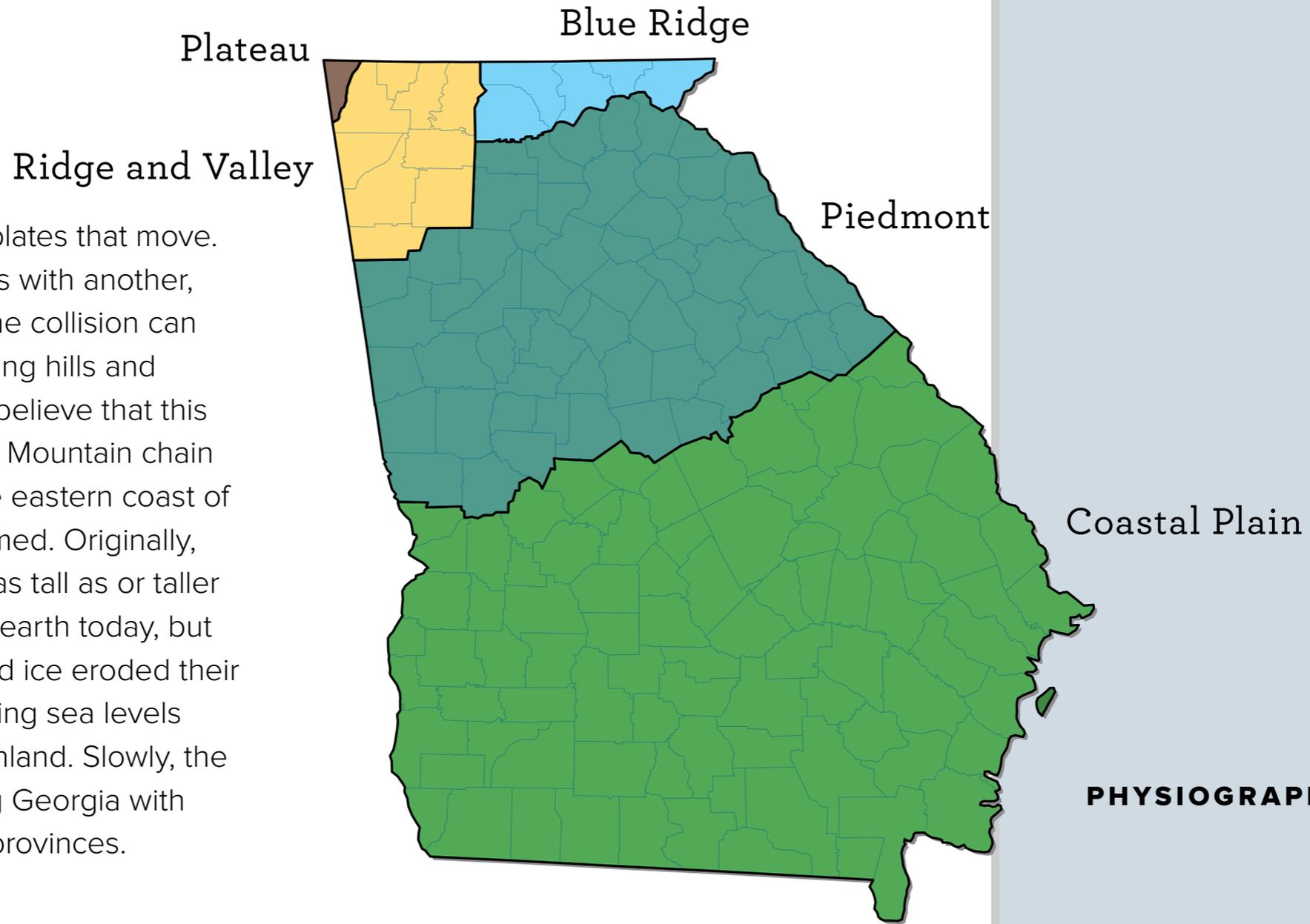
Within the United States, geographers have identified more than 30 natural regions. These regions, called **physiographic provinces**⁷, are based on similarities in land formations, elevation, rocks and minerals, soil, and other characteristics. Georgia is crossed by five provinces: (1) Coastal Plain, (2) Piedmont, (3) Blue Ridge, (4) Ridge and Valley, and (5) Appalachian Plateaus (or Plateau).

These provinces formed at different times and for different reasons. The outer layers

LOCATING *the* MAIN IDEAS

- 1 **Define:** landform, erosion, elevation, precipitation, relief, slope
- 2 The relief of Brasstown Bald is greater than the rise in elevation from sea level to its base. True or False?
- 3 Geographers use two ways to tell the height of a land formation. Explain the difference between the two.
- 4 How are the formation and flow of rivers affected by elevation?

of the earth consist of plates that move. When one plate collides with another, the earth's crust near the collision can fold and wrinkle—creating hills and mountains. Geologists believe that this is how the Appalachian Mountain chain that stretches along the eastern coast of North America was formed. Originally, these mountains were as tall as or taller than any mountains on earth today, but over time wind, rain, and ice eroded their jagged peaks. Later, rising sea levels brought the ocean far inland. Slowly, the water retreated, leaving Georgia with distinct physiographic provinces.



PHYSIOGRAPHIC REGIONS

THE COASTAL PLAIN

Georgia's largest physical region is the **Coastal Plain**⁸, which covers about 60 percent of the state. In a prehistoric time, this area was entirely covered by ocean. As the ocean shoreline advanced inland,

waves slowly wore away hills and other land formations in their path. As time passed, billions of seashells and other remains of ocean life sank to the sea floor. Tightly packed, they eventually became beds of a soft rock called limestone. Over time, rivers and streams deposited into

the ocean large amounts of soil, clay, and rock that had eroded from the hills and mountains to the north. As a result, thousands of feet of **sediment**⁹—or settled deposits—covered the ocean floor.



PHYSIOGRAPHIC REGIONS

Eventually, the ocean retreated, leaving a vast area of limestone, clay, sand, and other sedimentary deposits. This region is known as the Coastal Plain. It extends along the Atlantic and Gulf coasts from Massachusetts to Mexico, inland up to 200 miles.

Along the eastern states, the Coastal Plain’s interior boundary is marked by the **Fall Line**¹⁰. This line is actually a **zone**¹¹ or region several miles across. It marks the prehistoric ocean’s shoreline. Land north of the line is higher in elevation than that to the south, causing rivers to pick up speed as they travel—or fall—through this zone. South of the Fall Line, the ground is soft and sandy. Rivers widen, deepen, and move more slowly, making navigation by large boats possible. Later, you will learn how the Fall Line’s importance to river navigation and water power influenced Georgia history.

◀ The four **physiographic provinces** northwest of the Coastal Plain form a vast area of the eastern United States known as the Appalachian Highlands.

The Coastal Plain is relatively flat, with low relief and flat to gentle slopes. With no steep hills or rock near the surface, rivers entering the Coastal Plain from the north flow slowly, develop wider banks, and take a winding path. By the time they reach the coasts, many of these rivers—such as the Altamaha and Savannah—have become much wider.

Along Georgia’s coast, the land is low-lying. For about 75 miles inland, the soil typically consists of sand and clay, and is not very fertile. In general, the land is poorly drained, and swampy areas are common. Early settlers discovered that little would grow here except pine trees and brush, and they gave the name “Pine Barrens” to the region. Even today, this part of the state remains poorly suited for agriculture. The land is used mainly for pasture and growing pine trees for timber, pulp, turpentine, and other products.

Further inland, the Coastal Plain slowly rises in elevation, but seldom more than 500 feet above sea level. The well-drained soil consists of sand, clay, and other materials. This region is famous for its peanuts, peaches, and pecans.

THE PIEDMONT

Georgia’s second-largest physiographic province is the **Piedmont**¹², a French word for “foot of the mountains.” This hilly region makes up about 30 percent of the state and lies between the mountain regions of north Georgia and the Coastal Plain. Along its southern boundary, the Piedmont sits about 500 feet above sea level, but elevations range up to 1,700 feet at the southern edge of the Blue Ridge Mountains. The region consists mainly of rolling hills with many valleys. In some areas, however, the hills are quite tall and almost appear to be mountains.



Sometimes called goober peas, **peanuts** are one of Georgia’s most famous crops. They are grown primarily in the southwestern Coastal Plain. Georgia produces more peanuts than any other state.

In the Piedmont, large areas of solid rock are found just beneath the earth's surface. This is called **bedrock**¹³ and consists of such stone as granite, gneiss (pronounced "nice"), and marble. Unlike the sedimentary rock of the Coastal Plain, Piedmont bedrock generally is very hard. Because of this, it is common to see large areas of exposed bedrock called outcrops where the soil has been washed away. Other evidence of bedrock can be seen in river beds, along highways, and on many hillsides.

Numerous streams and rivers cross the Piedmont, generally flowing from north to south. Because of the bedrock, streams tend to have shallow beds, with narrow banks. Exposed rocks create frequent rapids, making navigation impossible for large boats.

A common feature of Piedmont soil is its distinctive red color. The red is the result of iron minerals found in granite and other

rock. Due to erosion and weathering, exposed rock in outcrops breaks down into iron and other minerals. Water then causes the iron to produce a rusty red soil often termed "Georgia red clay."

Except for areas with frequent outcrops and bedrock near the surface, Piedmont land generally is well suited for agriculture. Cotton, soybeans, and wheat are common crops. Beef cattle and dairy cattle are raised in large numbers, although the most important part of the agricultural economy is chicken broilers. Additionally, the land supports extensive forests, with pine trees an important part of the timber industry.

BLUE RIDGE

In terms of scenic beauty, Georgia's most striking physiographic province is the **Blue Ridge**¹⁴. Here are found the Blue Ridge Mountains, the highest in the Appalachian Highlands.



▲ **Georgia's Piedmont** is an area of rolling hills, red clay, and pine trees.

This range stretches from northeast Georgia to southern Pennsylvania, and contains the highest point east of the Mississippi River (North Carolina's 6,684-foot Mt. Mitchell). Georgia's highest mountain—Brasstown Bald, 4,784 feet above sea level—is located in the Blue Ridge province. Nearby, Springer Mountain (3,782 feet) marks the beginning of the Appalachian Trail, a hiker's path traveling 2,158 miles through the Appalachian Highlands to Maine.

The height of the Blue Ridge Mountains cools the warm, moist air currents off the Gulf of Mexico, producing great amounts of rainfall in most years. As a result, numerous rivers—such as the Chattahoochee and Savannah—begin here.

The Blue Ridge accounts for less than 1 percent of Georgia's prime farmland. Because of mountains and valleys, farms tend to be small. Steep slopes and high



rainfall also contribute to the highest erosion rate in Georgia.

High elevation also affects agriculture in the Blue Ridge. The growing season—the period between the last frost of spring and the first frost of fall—varies from 210 days along the southern boundary to 180 days in the area of highest elevation. Apples, corn, and other vegetables are suitable to the climate. Hardwood timber, such as oak and hickory, does well in the mountains.

◀ Unlike the taller and more rugged mountains of the West, the **Blue Ridge Mountains** are covered with hardwoods, pine, and other plants. The mountains are also home to a variety of wildlife, including deer, black bears, and other animals.

RIDGE AND VALLEY

Located west of the Blue Ridge is the **Ridge and Valley**¹⁵ province, a region which stretches 1,200 miles from northern New York to central Alabama. The Ridge and Valley has long, parallel ridges overlooking wide, rolling valleys. From the valley floor, the ridges appear to be mountains, but really the highest has a relief of only 700 feet from top to base. Elevations within the region range from 700 to 1,600 feet above sea level.

The Ridge and Valley province is nestled among the Blue Ridge, Piedmont, and Plateau provinces. Unlike the provinces to the south and east, which consist of hard bedrock, the Ridge and Valley consists of softer sedimentary rock. The ridges are composed of sandstone, while the valley floors were formed from limestone, shale, and other sedimentary deposits.

Today, the sandstone ridges are forest-covered. Valley floors are used for farming and pasture. With an average growing season of 210 to 220 days, a variety of crops can be grown here, including corn, soybeans, wheat, and cotton. The soil is moderately suited for agriculture and accounts for 4 percent of Georgia's prime farmland. Much of the land is used for pasture and harvesting hardwood and pine timber.

PLATEAU

Georgia's smallest physiographic province is the **Appalachian Plateaus**¹⁶, more commonly called the Plateau. A plateau is an area of flat or gently sloping land with a high relief over neighboring valleys and low-lying areas. Stretching from New York to Alabama are a series of plateaus along the western edge of the Appalachian Highlands. The southernmost of these—



Ruby Falls. The Ridge and Valley province is a region of long, roughly parallel ridges separated by wide valleys.

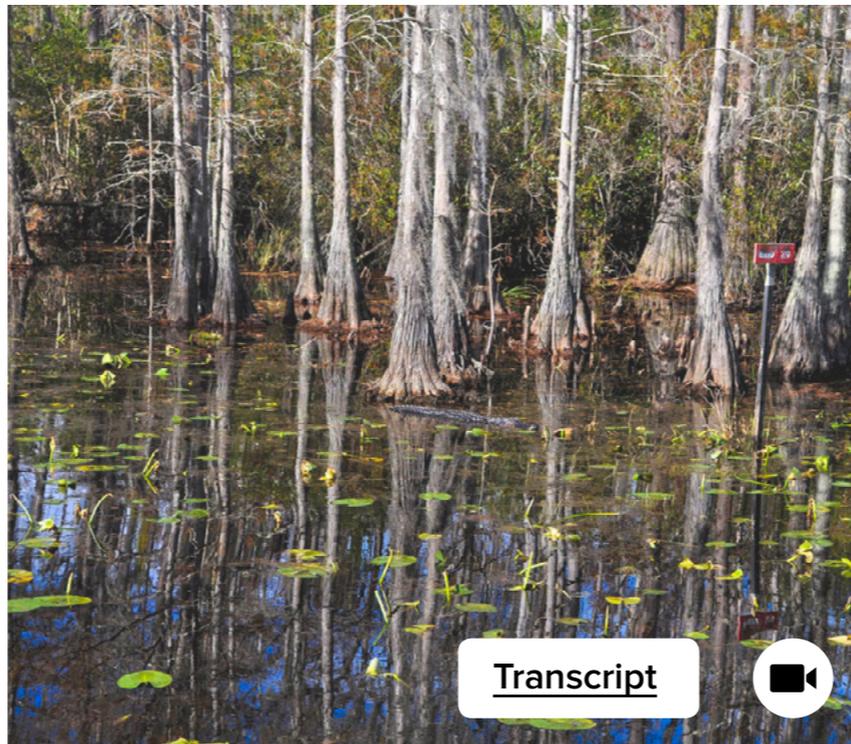
the Cumberland Plateau—includes about 300 square miles of the northwest corner of Georgia. Here you will find two flat-top features—Sand Mountain and the famous Lookout Mountain—separated by a deep and narrow valley. Off Lookout Mountain to the east is the thumb like Pigeon Mountain.

The Plateau province consists of sedimentary rock, principally sandstone, shale, and limestone. Land here is primarily used for hardwood forest and pasture, although a small amount of corn and soybeans is grown. This area marks the only known source of coal in Georgia. ■

GEORGIA'S COAST

Sandy beaches, coastal wildlife, seafood restaurants, seaside rooms, and historic sites make Georgia's coast a popular place to visit. Here, you'll find vacation sites on the Atlantic Ocean, such as Tybee Beach, St. Simons Island, and Jekyll Island. This is also the area first settled by British colonists in the 1730s.

Georgia's coast is not particularly long. In a small plane, you can fly from one end to the other in about 45 minutes—a distance of less than 100 miles. This flight, however, would not follow one long seashore. Instead, you would see a strange, irregular, yet beautiful scene below. Unlike California and Florida, Georgia's coast is not a continuous beach where sea abruptly meets dry land. Rather, it is a region consisting of (1) swamps, (2) rivers and streams, (3) **estuaries**¹⁷ (the area around a river's mouth where fresh and



[Transcript](#)



LOCATING *the* MAIN IDEAS

- 1 **Define:** physiographic province, Coastal Plain, sediment, Fall Line, zone, Piedmont, bedrock, Blue Ridge, Ridge and Valley, Appalachian Plateaus, Plateau
- 2 How many physiographic regions are there in the United States? in Georgia?
- 3 How was the Fall Line created?
- 4 Why do many Georgia rivers begin in the Blue Ridge province?

◀ **Coastal Georgia** is known for its beaches, marshes, and historical sites. Further inland is the Okefenokee Swamp, a National Wildlife Refuge and Wilderness Area, and one of the largest freshwater wetlands in America.

salt water mix), (4) numerous small islands in these estuaries, and (5) a chain of large coastal islands facing the ocean. Only on the seaward side of these outer islands will you find stretches of real beach.

There's another thing you should know about Georgia's coast. Because of **tides**¹⁸—the daily rise and fall of the ocean—the point where sea touches land is constantly rising or falling. At low tide, sea level is down and Georgia rivers are free to flow out to sea. At high tide, however, the ocean's height is up by six or seven feet. Seawater now rushes in, forcing rivers and streams to reverse their flow and carry a mixture of salt and fresh water inland for a distance of 10 miles or more. In the process, coastal rivers—also called tidal rivers—spill over their banks and flood low-lying areas, thus creating saltwater marshes. These marshes are one of the most important features of the coast.

COASTAL WETLANDS

A **wetland**¹⁹ is any area of low-lying land covered by water all or part of the time and in which special types of plant and animal life are found. Georgia has large areas of wetlands—ranking fourth in the nation in total number of acres. Many freshwater wetlands are found south of the Fall Line—particularly along rivers and streams and near the coast. The largest freshwater wetland in the state is the famous Okefenokee Swamp, located

Tybee Lighthouse is a popular tourist destination, having all of its support buildings on the 5-acre site historically preserved. It's one of just a handful of 18th-century lighthouses still in operation in North America.



south of Waycross along the Florida border.

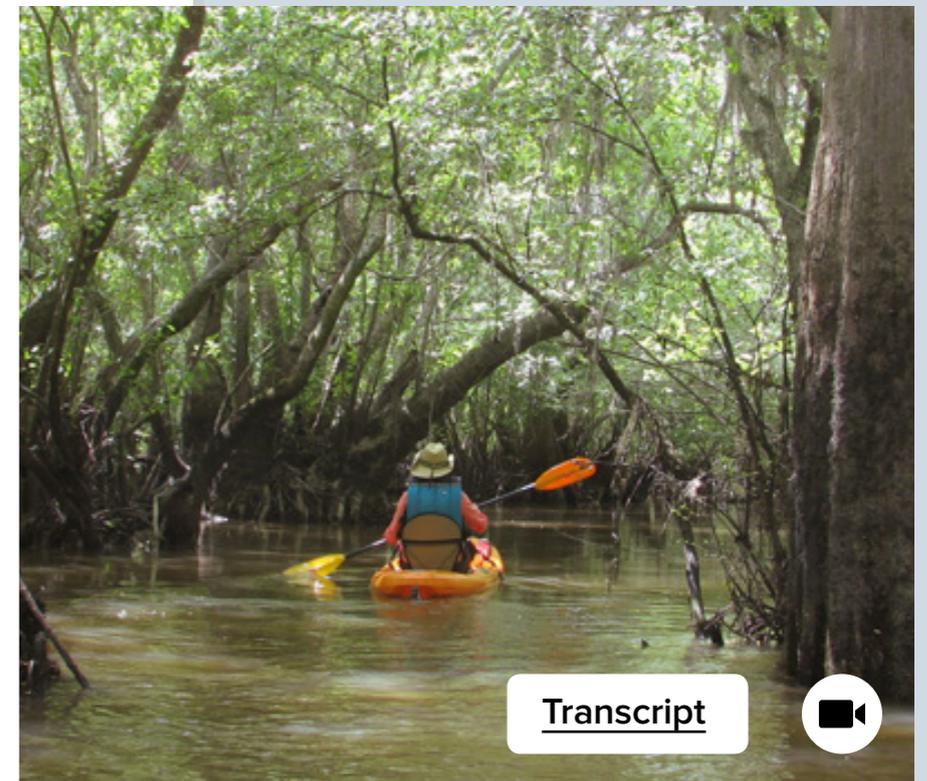
Along Georgia's coast are 400,000 acres of saltwater wetlands, commonly called **marshes**²⁰. Twice each day, Atlantic tides flood coastal rivers, streams, and estuaries. For several hours at a time, nearby land—actually mud—is covered with salt water. As a result, little vegetation can survive, except for salt marsh grass, cord grass, and a few other plants. Amazingly, a complex and rich **ecosystem**²¹ is supported by the marshes. The salt marshes teem with life.

Acre for acre, they are far more productive than the most fertile farmland. The reason marshlands are so productive is that minerals and other nutrients are deposited there by freshwater rivers and streams, as well as by tides. These fertilize marsh plant life and cause a **food chain**²² (a term for “eat and be eaten”) to begin. A variety of life is attracted, including insects, birds,

wildlife, and—most important of all—fish, shrimp, and crabs. Here they find food, as well as a nursery to safely raise their young. Because of Georgia's marshes, an important seafood industry has developed along the coast.

Coastal marshes serve other valuable functions. They serve as buffers for storms. They filter out many pollutants from the Savannah, Ogeechee, Altamaha, and other rivers before they discharge into the Atlantic. And, as any traveler driving along Interstate 95 or U.S. 17 can see, these marshes are a delight to view. Here you will see marsh grass swaying in the wind, egrets and other large wading birds, fiddler crabs, and other wildlife. More than a century ago, the beauty of Glynn County's tidal wetlands so impressed poet Sidney Lanier that he wrote “The Marshes of Glynn,” his most famous work.

The **Altamaha River** flows generally eastward for 137 miles (220 km) from its origin at the confluence of the Oconee River and Ocmulgee River towards the Atlantic Ocean. It is reportedly the third largest contributor of fresh water to the Atlantic Ocean from North America.



[Transcript](#)



BARRIER ISLANDS

Several miles off Georgia’s mainland lies a chain of sea islands. Geographers call these **barrier islands**²³ because they form a barrier, or wall, blocking ocean waves and wind from directly hitting the mainland.

Georgia’s offshore islands are frequently called the “Golden Isles,” a name given by early explorers expecting to find gold there. None was, but the name stuck. In the late 1800s, the title “Golden Isles” took on new meaning as millionaires from the North began buying these islands and building expensive winter homes there. Today, most of Georgia’s sea islands are protected by state or federal authorities. Many have been reserved as national wildlife refuges and wildernesses, and one—Cumberland—is now a national seashore. These designations help protect the islands and their animal and plant life from human injury and destruction.

Large areas of Georgia’s barrier islands barely rise above the sea and thus exist as marshlands because of the daily tides. Also, most are crisscrossed with rivers and streams. Viewed from the air, one large island actually appears to be several small connected islands.

Georgia’s beaches are found on the seaward side of the outer islands. The most visited beaches are on the islands of Tybee, St. Simons (of which Sea Island is a part), and Jekyll. Bridges and elevated highways (causeways) connect these three islands with the mainland, allowing visits by car. Access to other barrier islands is by boat or helicopter only.

Intracoastal Waterway, located between the **barrier islands** and the mainland. It allows fishing boats, pleasure craft, and shippers to travel up and down the coast.



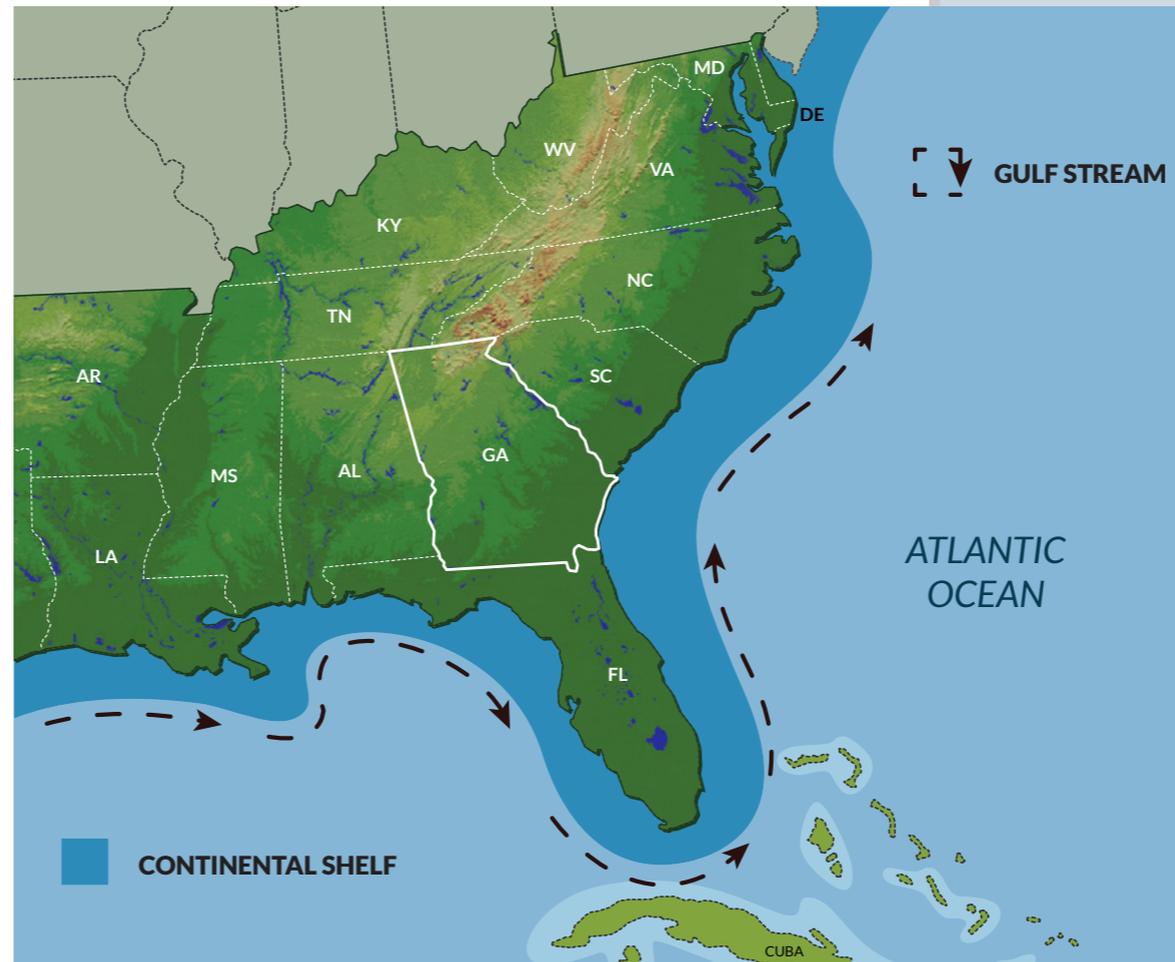
While driving to or from Tybee, St. Simons, or Jekyll islands, you may see boats on the waterway as you cross the bridges to the islands. This marks the famous **Atlantic Intracoastal Waterway**²⁴, a 1,000-mile inland water highway stretching from New York to Miami. Located between the barrier islands and the mainland, this channel allows fishing boats, pleasure craft, and shippers to travel up and down the coast protected from direct ocean winds, waves, and currents.

CONTINENTAL SHELF

Have you ever wondered how deep the ocean is off Georgia or why you can walk far out from shore before the water gets up to your head? On the East Coast, the ocean floor drops very gradually. For the first 70 or 80 miles off Georgia's coast, the drop is about two feet for each mile away from shore. After that, however,

the bed drops more sharply. If the ocean were drained, the floor from the shore to this drop-off would resemble a large, flat ledge—or shelf—attached to North America. Actually, this is the submerged part of the North American continent and thus is called the **continental shelf**²⁵.

This map shows the **Gulf Stream** and the **continental shelf** off the southeastern United States. About 450 miles east of Georgia's southern boundary is one of the deepest points in the Atlantic Ocean.



The continental shelf influences the path of the **Gulf Stream**²⁶. This is a current of warm ocean water flowing from the Gulf of Mexico up through the straits of Florida. It continues northward along the east coast of North America and then in a northeasterly direction across the Atlantic Ocean. The Gulf Stream stays in

the deeper waters beyond the continental shelf. ■

LOCATING *the* MAIN IDEAS

- 1 **Define:** estuary, tide, wetland, marsh, ecosystem, food chain, barrier island, Atlantic Intracoastal Waterway, continental shelf, Gulf Stream.
- 2 List the five features that make up Georgia’s coastal zone.
- 3 How are Georgia’s marshes important to humans and animal life?
- 4 What are two reasons why Georgia’s barrier islands are called the “Golden Isles”?

▶▶ FAST FORWARD



▲ Transcript

◀ **Skidaway Island State Park**
Despite what you see in cartoons, not all Park Rangers say “Hey, Boo Boo!” Luckily, one of ours does. You’ll want to meet her, along with the other rangers who help maintain this beautiful state park.

Vocabulary

- 1 **Landform** - A land formation found on the earth's surface.
- 2 **Erosion** - The wearing away of soil and rock by natural forces such as water or wind.
- 3 **Elevation** - The height of a land formation above sea level.
- 4 **Precipitation** - Water which reaches the earth from the atmosphere in either solid or liquid form, such as hail, sleet, mist, rain, or snow.
- 5 **Relief** - The difference in elevation within a landform from base to top.
- 6 **Slope** - The steepness of a landform, measured in degrees of a circle.
- 7 **Physiographic province** - A region defined on the basis of similarities in physical geography, such as land formations, elevation, rocks and minerals, and soils.
- 8 **Coastal Plain** - Georgia's largest physiographic province, covering all of Georgia south of the Fall Line (about 60 percent of the state). The low-relief region stretches from Massachusetts to Mexico.
- 9 **Sediment** - Settled deposits of earth and rock caused by water erosion.
- 10 **Fall Line** - The line (actually a zone) that marks the farthest inland shoreline of the prehistoric ocean.
- 11 **Zone** - 1: A region several miles wide that separates one geographic area from another. 2: An area in a community with a designated use.
- 12 **Piedmont** - Georgia's physiographic province that lies between the Fall Line to the south and the three mountain provinces of north Georgia. This hilly region stretches from central Alabama to southern New York.

- 13 **Bedrock** - Large areas of solid rock found just below the earth's surface.
- 14 **Blue Ridge** - Physiographic province stretching from northern Georgia to southern Pennsylvania that includes the highest mountains in the Appalachian Highlands.
- 15 **Ridge and Valley** - The physiographic province located in northwest Georgia, noted for long, often parallel ridges, separated by valleys. This province extends from central Alabama northward into Canada.
- 16 **Appalachian Plateaus (or Plateau)** - Physiographic province of high plateaus separated by valleys, stretching from northern Alabama to central New York. About 300 square miles of northwest Georgia lie in the Plateau region.
- 17 **Estuary** - The area around a river's mouth where fresh and salt water mix.
- 18 **Tides** - The daily rise and fall of the ocean caused principally by the gravitational pull of the moon.
- 19 **Wetland** - Low-lying land covered by water all or part of the time, in which special types of plant and animal life are found. Also known as marshes and swamps.
- 20 **Marsh** - Another name for saltwater or freshwater wetlands.
- 21 **Ecosystem** - Short for ecological system, it refers to a distinct, natural community of living and nonliving things and their environment.
- 22 **Food chain** - A feeding pattern for living organisms whereby one organism serves as food for another, which in turn becomes food for another, and so on.
- 23 **Barrier islands** - Chain of sea islands off Georgia's coast that form a barrier, helping block ocean waves and wind from the mainland.
- 24 **Atlantic Intracoastal Waterway** - The 1,000-mile-long coastal water highway that stretches from New York to Miami, used for navigation by smaller boats.

- 25 Continental shelf** - Large flat underwater ledge from the ocean's shoreline to a major dropoff, about 70 or 80 miles from Georgia's coast.
- 26 Gulf Stream** - The current of warm ocean water that flows from the Gulf of Mexico northward along the east coast of North America, then northeastward across the Atlantic Ocean.

Georgia's Natural Resources

WATER RESOURCES

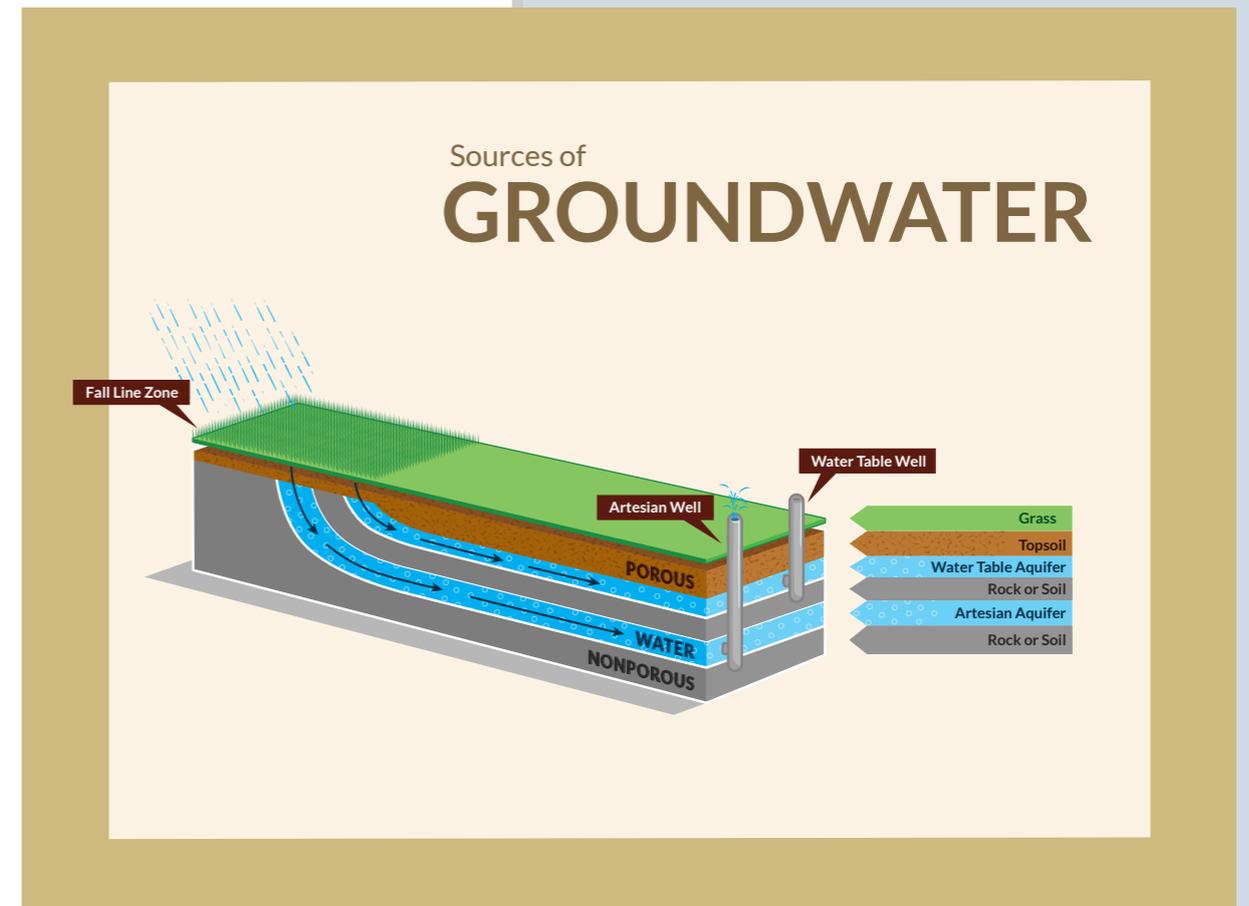
Since the late 1970s, Georgia has been one of the fastest-growing states in the nation. However, most of this growth has taken place north of the Fall Line, where over 70 percent of all Georgians live. The fastest-growing region is the Piedmont. Three out of every five Georgians live there, but it has no major underground sources of water.

To help meet the growing demand for water in north Georgia, state, federal, and local officials have devised a plan. It calls for building regional **reservoirs**¹—large artificial lakes—as well as some smaller lakes. But there are many problems to face, such as where to build new reservoirs, how to protect valuable wetlands, and who is going to pay.

South of the Fall Line, water resources are affected by the makeup of the earth beneath the surface. Here, sedimentary

beds of sand and porous rock such as limestone can store vast supplies of underground water, called **groundwater**². Pores—tiny spaces—in the sand and rock allow liquid to pass through it. Water-saturated layers of the earth are called **aquifers**³. How does water get into an aquifer? If the aquifer is near the earth's surface, its water comes mainly from rainfall.

There are two types of aquifers. One is found near the earth's surface. It extends from the **water table**⁴—the upper limit of water-saturated soil—down to the first dense, nonporous layer of earth. To obtain well water from this aquifer, an electric pump must be used to



bring the water to the surface. A second and deeper type of aquifer is found in some parts of Georgia. This is the **artesian aquifer**⁵. It is a porous layer of earth located between two denser layers. With nowhere to escape, water trapped in an artesian aquifer is under pressure. If a well is drilled into the aquifer, water will rise, perhaps even reaching the surface without the need for a pump.

South of the Fall Line, water for cities, irrigation, and other uses comes primarily from groundwater in artesian aquifers. North of the Fall Line, however, the earth is different. Instead of a porous soil, the surface has more clay and rock, which is less able to absorb rainfall. Because the surface is hilly, water runs off it, and less sinks into the ground than if the land were flat. Here, the geology of the subsurface is much different from the Coastal Plain. Except for northwest Georgia, there are few aquifers north of the Fall Line, and groundwater is limited. Bedrock beneath

the surface further prevents large amounts of water from collecting underground. Thus, most north Georgia cities and industries must depend on surface water—that is, water flowing in rivers and streams, or stored in ponds and lakes.

Areas of the state with large amounts of groundwater do not depend on rivers and lakes for their water supply. Parts of the state lacking groundwater, however, must depend on **surface water**⁶. A problem with river water is that rainfall declines in the summer and fall. If river levels get too low, cities have to restrict water use. They may put a ban on watering lawns or washing cars. No one can control rainfall, so we have to store water in reservoirs and use it wisely.

The **Fall Line** is a natural barrier that prevents boats from traveling north of it. In north Georgia, narrow rivers and streams flow quickly, making them ideal for whitewater rafting.



GEORGIA RIVERS AND STREAMS

Georgia is fortunate to have 20,000 miles of rivers and streams. Rivers determined Georgia's original boundaries and affected the location of its settlements.

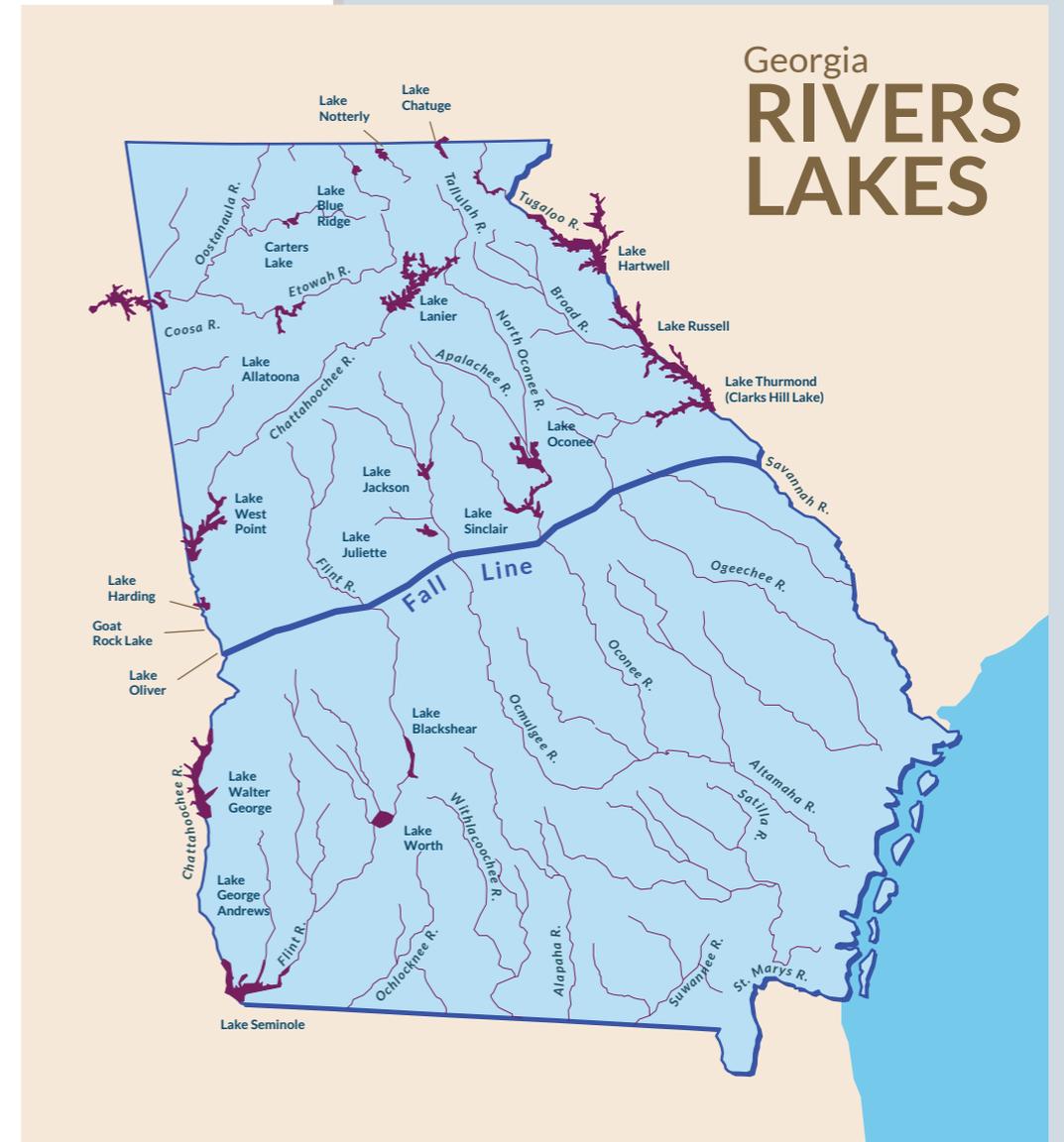
With few exceptions, Georgia rivers generally flow from north to south. Why? Because of the drop in surface elevation from north to south. Georgia as a whole slopes toward the southeast. Rivers and streams are pulled toward the sea, much like water flowing down a giant water slide.

CHARACTERISTICS OF GEORGIA RIVERS

North of the Fall Line, rivers and streams tend to have different characteristics from those to the south. Because of frequent rock beds, rivers here are more shallow

and narrow. Exposed rocks, uneven riverbeds, and the drop in elevation cause numerous rapids and waterfalls. The tumbling waters appear white. Attempting to “run” these rapids by raft or canoe is a popular sport, and Georgia is noted for its exciting—and dangerous—whitewater rivers.

Along some streams, you will find occasional **shoals**⁷—shallow areas where the river bottom consists of sand or layers of rock. Because they marked convenient places to cross the rivers, shoals frequently attracted settlements. One such community that survives today is North High Shoals, on the Apalachee River.



As rivers from the north approach the Fall Line zone, the slope of the surface drops fairly quickly. The water picks up speed, providing a force to power mills and machinery. This water power was an important factor in settlement along Fall Line river sites.

GEORGIA LAKES

Every summer, millions of visitors head to Georgia's lakes to boat, ski, swim, fish, picnic, or simply relax. Four out of every five Georgians live within 40 miles of a major freshwater lake. But this hasn't always been true. Early in this century, the only lakes in Georgia were ponds and, in south Georgia, water-filled hollow places in the ground known as sinkholes. Every one of our 33 major reservoirs has been built since 1910. Without them, modern Georgia could not have developed as it did.

The lake-building era in Georgia began with the arrival of the age of electricity.

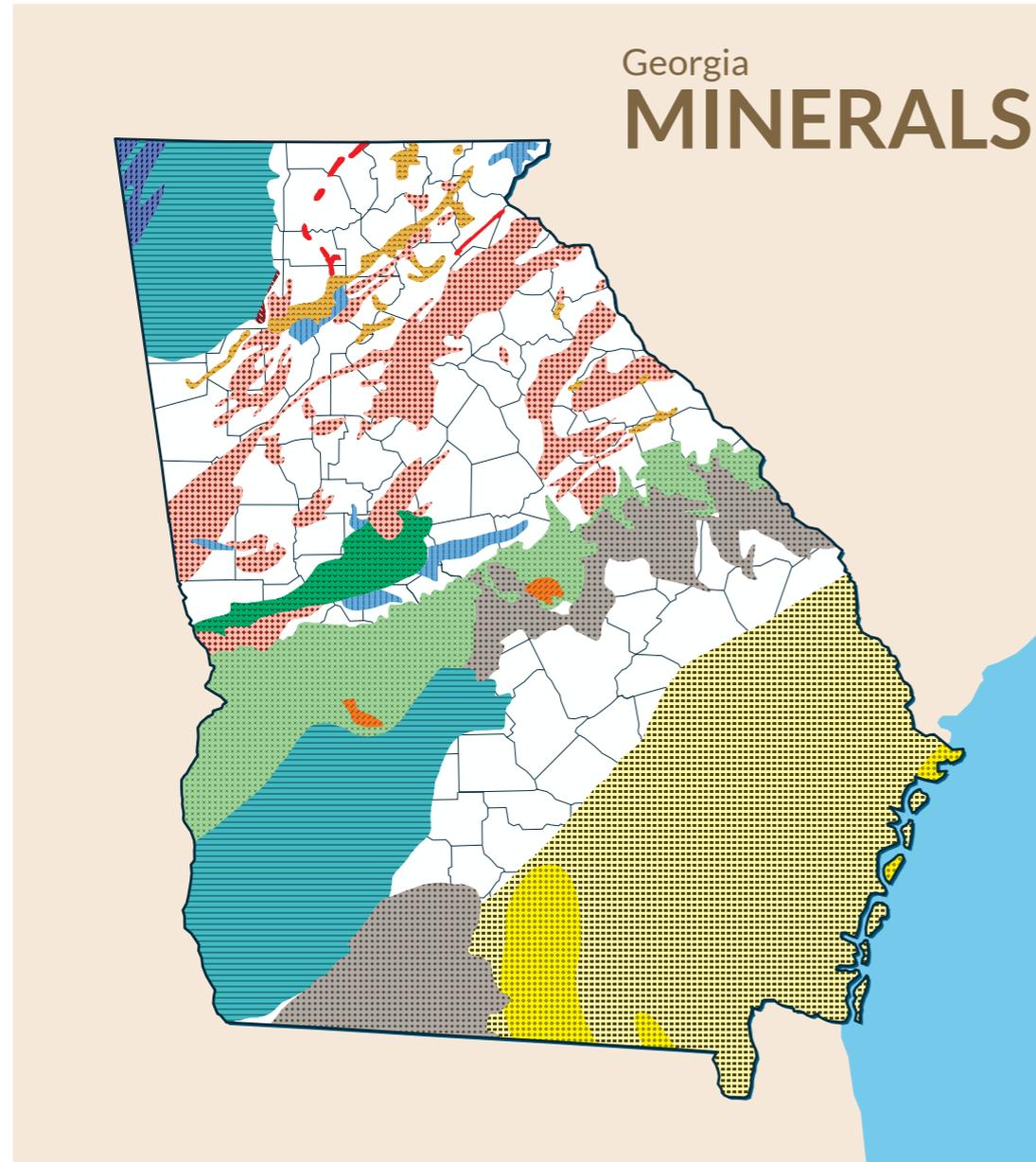
Georgians built dams in order to convert flowing river water into electricity. In the process, many reservoirs were created. Dams and reservoirs serve other purposes as well. They prevent floods, supply water to nearby cities, and provide downstream navigation. They are important to fish and wildlife conservation and to recreation.

ROCKS AND MINERALS

Rocks and minerals are a part of Georgia history. Before the coming of the Europeans, the natives chipped quartz and other stones into arrowheads and spearheads. They shaped stone into tools and used clays to make pottery. Of course, the search for gold and silver was one of the chief reasons that Hernando de Soto explored Georgia in 1540. Almost three centuries later, the discovery of gold



This dam on the Etowah River northwest of Atlanta forms **Lake Allatoona**. All lakes of significant size in Georgia are manmade. Most have been built by the U.S. Army Corps of Engineers.



world's leading producer of this mineral. Kaolin is used in many products, including the strong and glossy paper you see in some magazines and books and in paints.

Georgia marble was first used in 1838. Today, Georgia ranks first in the nation in marble production. The world's largest open pit quarry is at Tate in Pickens County. Marble in crushed form is used for agricultural lime and as a filler for such products as toothpaste and gum. Marble is also popular for cemetery headstones and monuments. One of

in Cherokee territory led to the nation's first gold rush and hastened the removal of the Indians.

Before the American Revolution, Georgia's kaolin was shipped to England to make Wedgwood pottery. Today, Georgia is the

the most famous statues in the world, the Lincoln Memorial in Washington, D.C., is made from Georgia marble.

Georgia ranks second in the nation in granite production. Although granite is popular for headstones, monuments, and

LEGEND

-  Barite
-  Bauxite
-  Feldspar, Mica
-  Fuller's Earth
-  Gold
-  Granite, Gneiss
-  Iron and Coal
-  Kaolin
-  Limestone, Sandstone
-  Marble
-  Mica, Feldspar, Granite
-  Phosphate
-  Phosphate Concentration

buildings, it is mainly used in crushed form. One mile of four-lane highway may consist of over 40,000 tons of crushed granite. Elbert County is known as the granite capital of the world.

Other important rocks and minerals mined in Georgia include limestone, fuller's earth, mica, bauxite, barite, phosphate, feldspar, and over a dozen more.

Although rich in a variety of rocks and minerals, Georgia is lacking in energy-related resources. The only supplies of coal are in the extreme northwest corner of the state. To date, more than 200 wells have been drilled in exploring for oil or natural gas, but none were successful. ■

GEORGIA'S WEATHER AND CLIMATE

What's the weather like in Georgia today? Your answer will probably tell whether it's hot or cold, cloudy or sunny, rainy or dry, and windy or calm. Georgia is such

a large state that the weather can be quite different, depending on where you happen to be.

Weather⁸ refers to conditions in the atmosphere—the air, clouds, and gasses around the earth—on any given day.

Climate⁹, on the other hand, refers to the average weather conditions over time—at least 25 to 30 years. Weather affects whether we go to the beach today or tomorrow. Climate determines what kind of crops a farmer will plant.

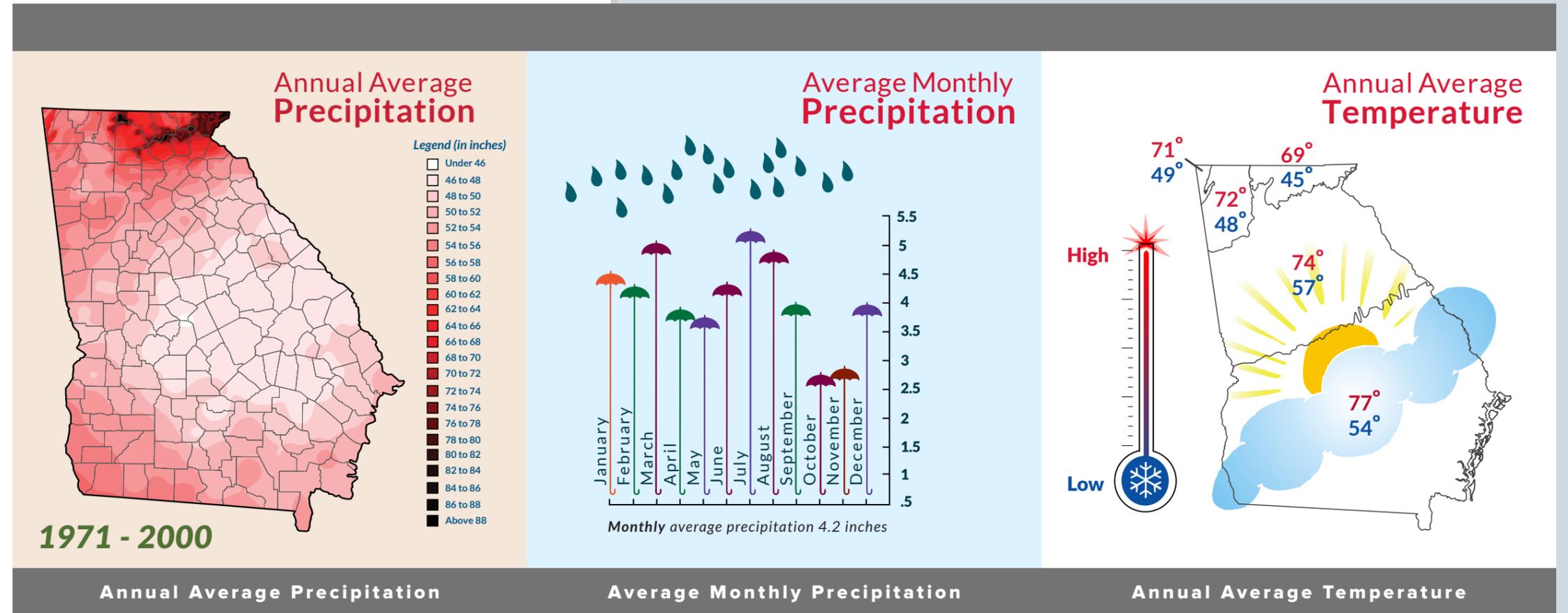
Climate was important to the creation of Georgia in 1732. Because Georgia lay at the same latitude as China, India, Persia, and Palestine, England's leaders believed the colony could become its new source of crops grown in those lands. They expected the colonies to produce wine, silk, rice, tea, olives, oranges, cotton, and indigo. As it turned out, some of the desired crops fared well in Georgia. Others—such as grapes for wine—were

LOCATING *the* MAIN IDEAS

- 1 **Define:** reservoir, groundwater, aquifer, water table, artesian aquifer, surface water, shoals
 - 2 Where do most Georgians south of the Fall Line get their drinking water? North of the Fall Line, where does most drinking water come from?
 - 3 List five reasons for building a reservoir.
 - 4 How are granite and marble important to Georgia?
-

not suited to the humidity and diseases of the coastal climate.

Georgia's climate is mainly determined by geographic location. It is near the Atlantic Ocean, the Gulf of Mexico, and the eastern edge of the continent. These factors, combined with Georgia's closeness to the Equator, result in a climate of hot summers, mild winters, and, in most years, abundant rainfall throughout most of the state.



CLIMATE AND GEORGIA'S DEVELOPMENT

Georgia's moderate temperatures have helped the state to grow and develop. The cool summers in the north Georgia mountains have attracted many new residents to this area. Dotted the slopes and ridges of the Blue Ridge Mountains are vacation and retirement homes. High elevations have even made a snow ski resort possible at Sky Valley, in the extreme northeastern corner of the state.

For the rest of the state, mild winters have contributed to a continuing population migration into Georgia. Mild winters have also helped attract the military. To date, a total of 12 army, air force, navy, and marine bases and installations have been built in Georgia. The last new base was Kings Bay submarine facility in Camden County, created in 1978. A warm climate means that outdoor training, flights, and other military operations can go on year-round.

PRECIPITATION

Have you ever wondered how water gets into clouds, or what happens to rain after it hits the ground? The answer to these and many other questions involves the **water cycle**¹⁰. This refers to the journey of water from ocean to rainfall, its use and reuse on land, and then its return to the sea.

In most years, Georgia receives abundant rainfall, snow, and other forms of precipitation—an average of 50 inches annually. Depending on where you live, you may get more or less rainfall than the state average. The annual rate varies from about 80 inches in Rabun County in extreme northeast Georgia to half that amount in the Augusta area.

Georgia's nearness to the ocean helps account for a usually abundant precipitation. The Gulf of Mexico is responsible for this blessing. That is

because most winds and weather patterns affecting Georgia come from the west and southwest. As warm Gulf water evaporates, moisture rises and is blown to the northeast. Pushed over the Blue Ridge Mountains, the air cools, resulting in frequent rains. Precipitation also occurs as warm Gulf air meets colder air currents flowing down from Canada.

HURRICANES

Because of the shape of the southeastern coast, Georgia is less exposed to the full impact of hurricanes than either Florida or the Carolinas. The wide expanse of the continental shelf off Georgia's coast also helps influence most hurricane storms to move northward. But a direct hit along Georgia's barrier islands is possible. Today, satellite tracking of hurricanes allows forecasters to predict where and when a storm may hit land, thus allowing time to



▲ **Downtown Augusta, 1908.** Such flooding was a common occurrence in river cities before the building of dams and levees.



▲ In Georgia, the greatest hurricane damage usually results from flooding rather than wind damage. In **1994**, Tropical Storm Alberto dumped record amounts of rain on southwest Georgia. In **Baker County**, flood waters from the Flint River almost reached the second floor of the courthouse.



▲ In **1936**, the deadliest tornado in state history hit **Gainesville**, killing 203 people and flattening many downtown businesses.

evacuate residents. Hurricanes develop on warm ocean water and are most likely to occur in September and least likely in April.

TORNADOES

Tornadoes are violent whirlwinds that can develop when a cold front moves rapidly into an area of warm, moist air, resulting in severe thunderstorms. Winds may reach over 200 miles an hour, and destruction can be severe in their path. These damaging wind funnels strike Georgia an average of 19 times a year. Tornadoes are most likely to strike in April and least likely in October.

AIR AND OCEAN CURRENTS

When early explorers sailed to the New World on their voyages of discovery,

they were risking their lives. Maps and navigation instruments were primitive, and once on the high seas, ship captains were at the mercy of the weather. In time, however, they learned to use wind and ocean currents to speed their long journeys across the Atlantic. A **current**¹¹ is a continuous movement or flow of a large body of air or water along a particular path.

What causes air and water to travel great distances as currents? The main cause is the uneven heating of the earth by the sun. The sun strikes the earth most directly at the Equator and least directly at the poles. This means that air, water, and land temperatures are hottest along the Equator and coolest in the polar regions.

AIR CURRENTS

Have you ever wondered why cool breezes flow in off the ocean or why

LOCATING *the* MAIN IDEAS

- 1 Define:** weather, climate, water cycle
 - 2** Why did England's leaders think the Georgia colony could produce wine, silk, rice, tea, olives, oranges, cotton, and indigo?
 - 3** How has Georgia's climate contributed to its growth?
 - 4** How does the Gulf of Mexico help account for Georgia's abundant precipitation?
-

chilling winds are so common during winter months? Winds, or air currents, occur because air tends to flow from cooler places, such as the ocean, to warmer places, such as land.

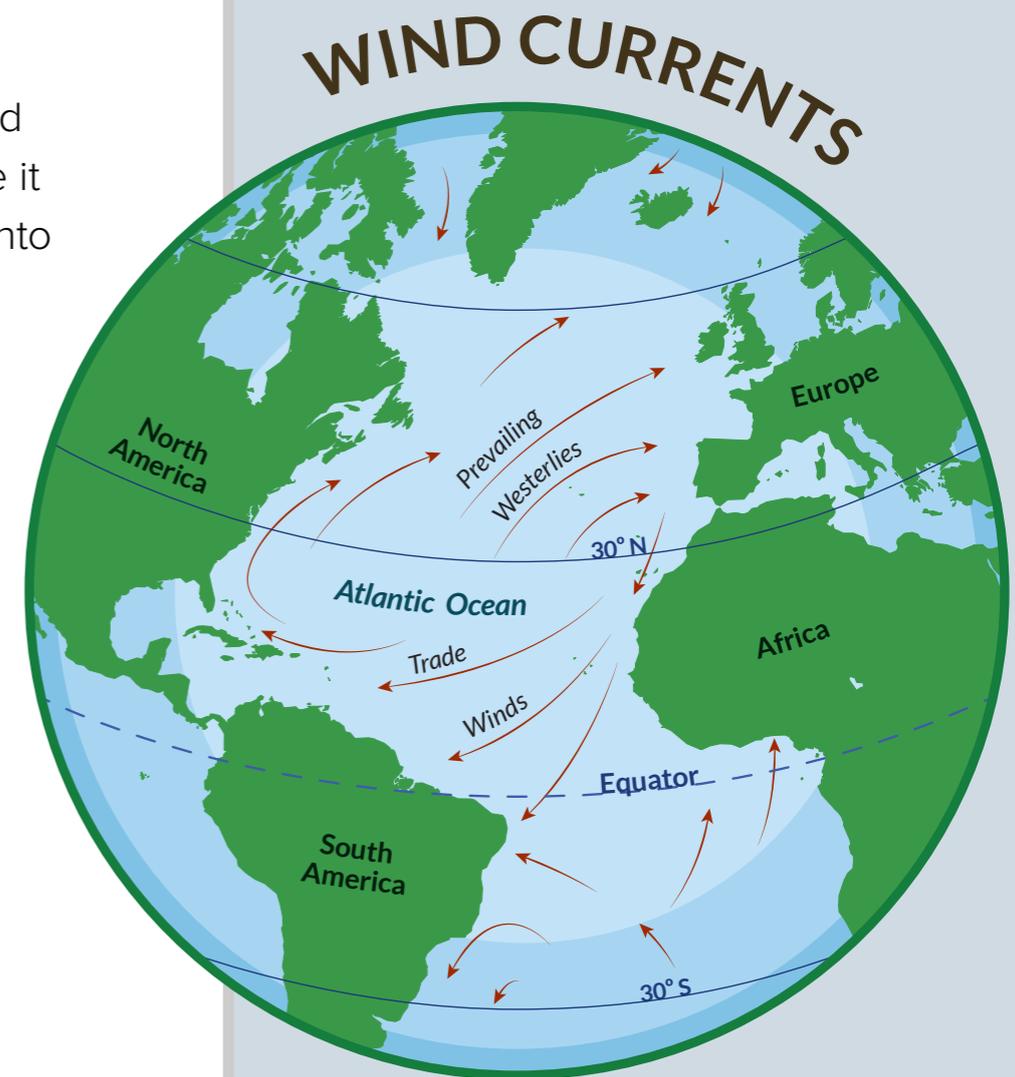
As air is warmed, it expands and rises. The opposite occurs as air cools—it contracts and sinks. Because warm air is lighter, it exerts less pressure on the earth’s surface. In contrast, cooler air is heavier, producing greater pressure. Around the earth, air is always flowing from areas of high pressure to those of low pressure in order to balance our atmosphere. This constant shifting creates air currents on land and sea.

Early ship captains did not know what caused sea winds, but they soon realized how important they were to sailing across the Atlantic. As merchants and traders replaced explorers, the winds came to be known as the trade winds.

The **trade winds**¹² helped in sailing from

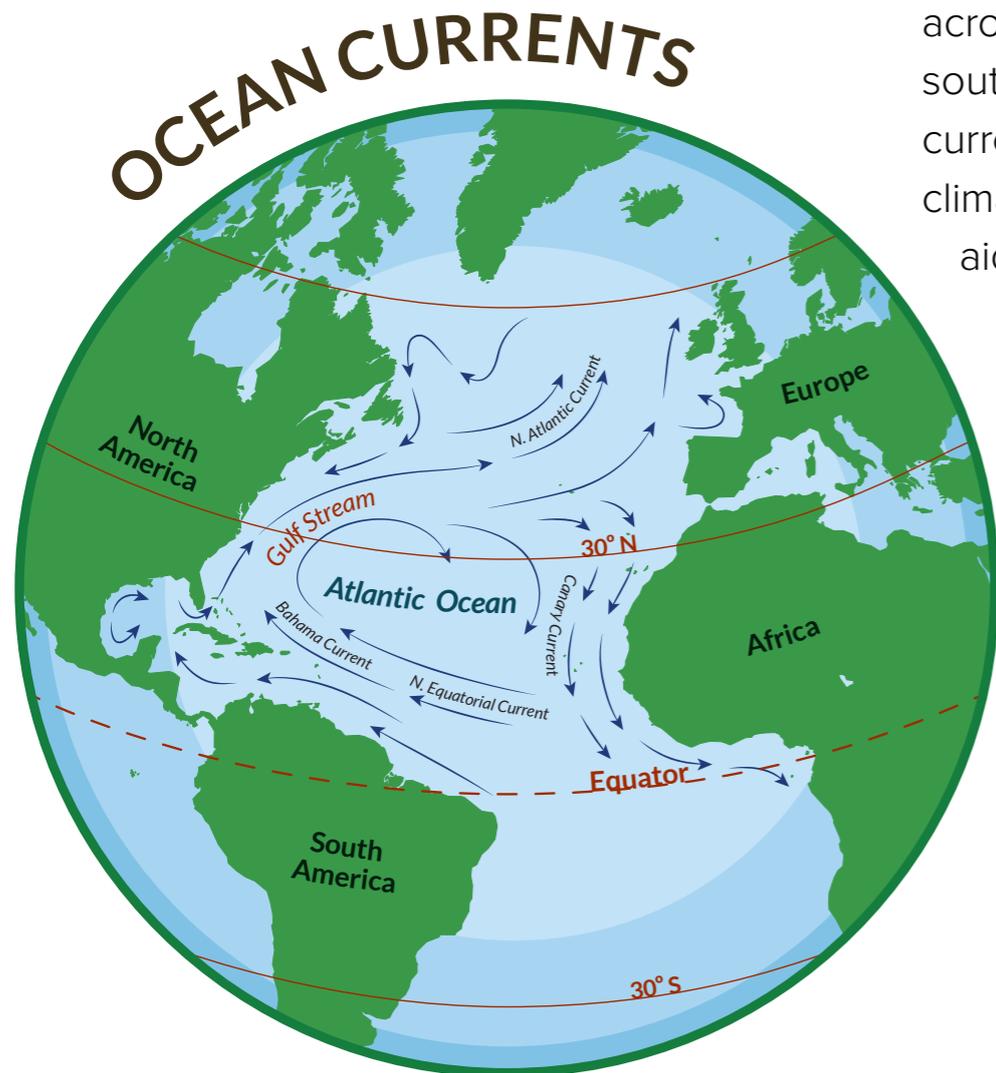
Europe to America. But what about getting back? Between latitude 35°N and 60°N, cold high pressure from the polar region influences a pattern of winds that blow from the west to the northeast. These air currents, called **prevailing westerlies**¹³, helped carry sailing ships from America back to Europe.

One other air current which you should know about is the **jet stream**¹⁴—since it sometimes brings very cold weather into Georgia. This is a “river” of air found between 30,000 and 40,000 feet above sea level, flowing at speeds of 100 to 300 miles per hour. This current follows an irregular pattern around the earth, sometimes bringing polar air in from the northwest and influencing weather in the United States. This current was named because pilots of high-flying jet aircraft found that they could cut flying time and fuel use by riding with this current.



OCEAN CURRENTS

Similar to air currents are the movements of water masses in the ocean. Near the surface, these tend to follow the general path of air currents. They result from wind



action and the uneven heating of the world's oceans by the sun.

One of the most famous ocean currents in the world is the Gulf Stream. It originates in the Caribbean Sea and Gulf of Mexico and travels up through the straits of Florida and along the East Coast. Then it flows across the north Atlantic, breaking up south of Greenland. This warm water current helps keep the southeastern climate mild during winter. The Gulf Stream aided early travel and trade between Europe and the Western Hemisphere. The first to use it were the Spanish explorers returning to Spain aboard great ships loaded with gold, silver, and other treasure from Central and South America. Later, the current cut travel time on the voyage from the American colonies eastward to England. ■

LOCATING *the* MAIN IDEAS

- 1 **Define:** current, trade winds, prevailing westerlies, jet stream
- 2 What are the causes of air and water currents?
- 3 How did ocean currents affect European exploration and trade with the New World?

Vocabulary

- 1 **Reservoirs** - An artificial lake built to store and control water for such purposes as public water supply, hydro-electric production, flood control, and recreation.
- 2 **Groundwater** - Water that lies underground.
- 3 **Aquifers** - Water-saturated layers of the earth below the surface.
- 4 **Water table** - The upper limit of water-saturated soil.
- 5 **Artesian aquifer** - A deep aquifer in which water is trapped and held under great pressure by denser layers of earth above and below the aquifer.
- 6 **Surface water** - Aboveground water stored in rivers, streams, and lakes.
- 7 **Shoals** - Shallow river areas where the bottom is made up of sand or layers of rocks.
- 8 **Weather** - Conditions in the atmosphere on any given day.
- 9 **Climate** - Average weather conditions over a time period of at least 25 years.
- 10 **Water cycle** - The journey of water from ocean to rainfall, its use and reuse on land, and then its return to the sea.
- 11 **Current** - The steady flow or movement of a large body of air or water along a particular path.
- 12 **Trade winds** - Constant air currents at sea caused by high and low pressure areas attempting to equalize. Important for sailing ships crossing the Atlantic.
- 13 **Prevailing westerlies** - A pattern of winds that blow from the west to the northeast. Important for sailing ships crossing the Atlantic.

- 14 **Jet stream** - A rapid current of air flowing between 30,000 and 40,000 feet above sea level.



CHAPTER 2 QUIZ

Text Version