surrounding area. Bars, hotels, sports facilities, transit stops, and other information about the neighborhood can be mapped.

KEY ISSUE 2
Why Is Each Point on Earth Unique?

- Place: Unique Location of a Feature
- Regions: Areas of Unique Characteristics
- Spatial Association

Each place on Earth is in some respects unique and in other respects similar to other places. The interplay between the uniqueness of each place and the similarities among places lies at the heart of geographic inquiry into why things are found where they are.

Two basic concepts help geographers to explain why every point on Earth is in some ways unique—place and region. The difference between the two concepts is partly a matter of scale: A place is a point, whereas a region is an area.

Place Names

Because all inhabited places on Earth’s surface—and many uninhabited places—have been named, the most straightforward way to describe a particular location is often by referring to its place name. A toponym is the name given to a place on Earth (Figure 1-9).

A place may be named for a person, perhaps its founder or a famous person with no connection to the community. George Washington’s name has been selected for one state, counties in 31 other states, and dozens of cities, including the national capital. Places may be named for an obscure person, such as Jenkinjones, West Virginia, named for a mine operator, and Gassaway, West Virginia, named for a U.S. senator.

Some settlers select place names associated with religion, such as St. Louis and St. Paul, whereas other names derive from ancient history, such as Athens, Attica, and Rome. A place name may also indicate the origin of its settlers. Place names commonly have British origins in North America and Australia, Portuguese origins in Brazil, Spanish origins elsewhere in Latin America, and Dutch origins in South Africa.

Pioneers lured to the American West by the prospect of finding gold or silver placed many picturesque names on the landscape. Place names in Nevada selected by successful miners include Eureka, Lucky Boy Pass, Gold Point, and Silver Peak. Unsuccessful Nevada pioneers sadly or bitterly named other places, such as Battle Mountain, Disaster Peak, and Massacre Lake. The name Jackpot was given in 1959 by the Elko, Nevada, county commissioners to a town near the Idaho state border in recognition of the importance of legalized gambling to the local economy.

Some place names derive from features of the physical environment. Trees, valleys, bodies of water, and other natural features appear in the place names of most languages. The capital of the Netherlands, called ’s-Gravenhage in Dutch (in English, The Hague), means “the prince’s forest.” Aberystwyth, in Wales, means “mouth of the River Ystwyth,” while 22 kilometers (13 miles) upstream lies the tiny village of Cwmystwyth, which means “valley of the Ystwyth.” The name of the river, Ystwyth, in turn, is the Welsh word for “meandering,” descriptive of a stream that bends like a snake.
Places can change names. The city of Cincinnati was originally named Losantiville. The name was derived as follows: L is for Licking River; os is Latin for mouth; anti is Latin for opposite; ville is Latin for town—hence, “town opposite the mouth of the Licking River.” The name was changed to Cincinnati in honor of a society of Revolutionary War heroes named after Cincinnatus, an ancient Roman general.

Hot Springs, New Mexico, was renamed Truth or Consequences in 1950 in honor of a long-running radio and television program of that name. The name was changed by an overwhelmingly favorable vote of the residents in order to promote publicity for the economically struggling town.

The Board of Geographical Names, operated by the U.S. Geological Survey, was established in the late nineteenth century to be the final arbiter of names on U.S. maps. In recent years the board has been especially concerned with removing offensive place names, such as those with racial or ethnic connotations.

Names can also change as a result of political upheavals. For example, following World War II, Poland gained control over territory that was formerly part of Germany and changed many of the place names from German to Polish. Among the larger cities, Danzig became Gdansk, Breslau became Wroclaw, and Stettin became Szczecin. After the fall of communism in the early 1990s, names throughout Eastern Europe were changed, in many cases reverting to those used before the Communists had gained power some decades earlier. For example after the demise of communism, Gottwaldov (named for a Communist president of Czechoslovakia) reverted to its former name, Zlín, in the Czech Republic; Leningrad (the second-largest city in the Soviet Union) reverted to St. Petersburg, Russia; and Karl-Marx-Stadt (in East Germany) reverted to Chemnitz in a reunified Germany.

Site

The second way that geographers describe the location of a place is by site, which is the physical character of a place. Important site characteristics include climate, water sources, topography, soil, vegetation, latitude, and elevation. The combination of physical features gives each place a distinctive character.

Site factors have always been essential in selecting locations for settlements, although people have disagreed on the attributes of a good site, depending on cultural values. Some have preferred a hilltop site for easy defense from attack. Others located settlements near convenient river-crossing points to facilitate communication with people in other places.

Humans have the ability to modify the characteristics of a site. The southern portion of New York City’s Manhattan Island is twice as large today as it was in 1626, when Peter Minuit bought the island from its native inhabitants for the equivalent of $23.75 worth of Dutch gold and silver coins (Figure 1-10). Manhattan’s additional land area was created by filling in portions of the East River and the Hudson River. In the eighteenth century, landfills were created by sinking old ships and dumping refuse on top of them. More recently, New York City permitted construction of Battery Park City, a 57-hectare (142-acre) site designed to house more than 20,000 residents and 30,000 office workers. The central areas of Boston and Tokyo have also been expanded through centuries of landfilling in nearby bays, substantially changing these sites.

Situation

Situation is the location of a place relative to other places. Situation is a valuable way to indicate location, for two reasons—finding an unfamiliar place and understanding its importance.

First, situation helps us find an unfamiliar place by comparing its location with a familiar one. We give directions to people by referring to the situation of a place: “It’s down past the courthouse, on Locust Street, after the third traffic light, beside the yellow-brick bank.” We identify important buildings, streets, and other landmarks to direct people to the desired location.

Second, situation helps us understand the importance of a location. Many locations are important because they are accessible to other places. For example, because of its situation, Singapore has become a center for the trading and
distribution of goods for much of Southeast Asia (Figure 1-11). Singapore is situated near the Strait of Malacca, which is the major passageway for ships traveling between the South China Sea and the Indian Ocean. Some 50,000 vessels, one-fourth of the world’s maritime trade, pass through the strait each year.

Mathematical Location

The location of any place on Earth’s surface can be described precisely by meridians and parallels, two sets of imaginary arcs drawn in a grid pattern on Earth’s surface (Figure 1-12).

- **A meridian** is an arc drawn between the North and South poles. The location of each meridian is identified on Earth’s surface according to a numbering system known as **longitude**.

  The meridian that passes through the Royal Observatory at Greenwich, England, is 0° longitude, also called the **prime meridian**. The meridian on the opposite side of the globe from the prime meridian is 180° longitude. All other meridians have numbers between 0° and 180° east or west, depending on whether they are east or west of the prime meridian. For example, New York City is located at 74° west longitude, and Lahore, Pakistan, at 74° east longitude. San Diego is located at 117° west longitude, and Tianjin, China, at 117° east longitude.

- **A parallel** is a circle drawn around the globe parallel to the equator and at right angles to the meridians. The numbering system to indicate the location of a parallel is called **latitude**.

  The equator is 0° latitude, the North Pole 90° north latitude, and the South Pole 90° south latitude. New York City is located at 41° north latitude, and Wellington, New Zealand, at 41° south latitude. San Diego is located at 33° north latitude, and Santiago, Chile, at 33° south latitude.

  Latitude and longitude are used together to identify locations. For example, Midland, Texas, is located at 32° north latitude and 102° west longitude.

  The mathematical location of a place can be designated more precisely by dividing each degree into 60 minutes (’’) and each minute into 60 seconds (”’). For example, the official mathematical location of Denver, Colorado, is 39°44’ north latitude and 104°59’ west longitude. The state capitol building in Denver is located at 39°42’52” north latitude and 104°59’04” west longitude. GPS systems typically divide degrees into decimal fractions rather than minutes and seconds. Toyota’s factory in Georgetown, Kentucky, for example, is located at 38.233407° north latitude and 84.550239° west longitude.

  Measuring latitude and longitude is a good example of how geography is partly a natural science and partly a study of human behavior. Latitudes are scientifically derived by Earth’s...
shape and its rotation around the Sun. The equator (0° latitude) is the parallel with the largest circumference and is the place where every day has 12 hours of daylight. Even in ancient times, latitude could be accurately measured by the length of daylight and the position of the Sun and stars.

On the other hand, 0° longitude is a human creation. Any meridian could have been selected as 0° longitude, because all have the same length and all run between the poles. The 0° longitude runs through Greenwich because England was the world’s most powerful country when longitude was first accurately measured and the international agreement was made. For many centuries, inability to measure longitude was the greatest obstacle to exploration and discovery. Ships ran aground or were lost at sea because no one on board could pinpoint longitude. In 1714, the British Parliament enacted the Longitude Act, which offered a prize equivalent to several million in today’s dollars to the person who could first measure longitude accurately.
English clockmaker John Harrison won the prize by inventing the first portable clock that could keep accurate time on a ship—because it did not have a pendulum. When the Sun was directly overhead of the ship—noon local time—Harrison’s portable clock set to Greenwich time could say it was 2 PM in Greenwich, for example, so the ship would be at 30° west longitude, because each hour of difference was equivalent to traveling 15° longitude. (Most eighteenth-century scientists were convinced that longitude could be determined only by the position of the stars, so Harrison was not actually awarded the prize until 40 years after his invention.)

FIGURE 1-12 Geographic grid. Meridians are arcs that connect the North and South poles. The meridian through Greenwich, England, is the prime meridian, or 0° longitude. Parallels are circles drawn around the globe parallel to the equator. The equator is 0° latitude and the North Pole is 90° north latitude.

Regions: Areas of Unique Characteristics

The “sense of place” that humans possess may apply to a larger area of Earth rather than to a specific point. A person may feel attachment as a native or resident of the Los Angeles area, or the area of attachment could encompass southern California or the U.S. Southwest. An area of Earth defined by one or more distinctive characteristics is a region.

Cultural Landscape

A region derives its unified character through the cultural landscape—a combination of cultural features such as language and religion, economic features such as agriculture and industry, and physical features such as climate and vegetation. The Los Angeles region can be distinguished from the New York region, southern California from northern California, the Southwest from the Midwest.

The contemporary cultural landscape approach in geography—sometimes called the regional studies approach—was initiated in France by Paul Vidal de la Blache (1845–1918) and Jean Brunhes (1869–1930). It was later adopted by several American geographers, including Carl Sauer (1889–1975) and Robert Platt (1880–1950). Sauer defined cultural landscape as an area fashioned from nature by a cultural group. “Culture is the agent, the natural area the medium, the cultural landscape is the result.”

Cultural landscape geographers argued that each region has its own distinctive landscape that results from a unique combination of social relationships and physical processes. People, activities, and environment display similarities and regularities within a region and differ in some way from those of other regions. A region gains uniqueness from possessing not a single human or environmental characteristic, but a combination of them. Not content to merely identify these characteristics, geographers seek relationships among them. Geographers recognize that in the real world, characteristics are integrated.

The fundamental principle underlying the cultural landscape approach is that people are the most important agents of change to Earth’s surface. The distinctive character of a particular landscape may derive in part from natural features, such as vegetation and soil. However, the physical environment is not always the most significant factor in human decisions. People can fashion a landscape by superimposing new forms on the physical environment. For example, the critical factor in selecting a site for a cotton textile factory is not proximity to a place where cotton is grown. A more important factor in selecting a suitable location is access to a supply of low-cost labor. Economic systems, political structures, living arrangements, religious practices, and human activities can produce distinctive landscapes that do not stem primarily from distinctive physical features.

The geographer’s job is to sort out the associations among various social characteristics, each of which is uniquely distributed across Earth’s surface. For example, geographers conclude that political unrest in sub-Saharan Africa, Southwest Asia, and other areas derives in large measure from the fact that the distributions of important features, such as ethnicity and resources, do not match the political boundaries of individual countries.

Types of Regions

The designation of “region” can be applied to any area larger than a point and smaller than the entire planet. Geographers most often apply the concept at one of two scales:

- Several neighboring countries that share important features, such as those in Latin America
- Many localities within a country, such as those in southern California.

A particular place can be included in more than one region depending on how the region is defined.

Geographers identify three types of regions—formal, functional, and vernacular.

FORMAL REGION. A formal region, also called a uniform region or a homogeneous region, is an area within which everyone shares in common one or more distinctive characteristics. The shared feature could be a cultural value such as a common
The Cultural Landscape

longitude, divided by 15° per hour, equals 5 hours). Thus when the time is 11 AM earlier than GMT (the 75° difference between the prime meridian and 75° west longitude), we get 24 time zones, or one for each hour of the day. By international agreement, Greenwich Mean Time (GMT) or Universal Time (UT), which is the time at the prime meridian (0° longitude), is the master reference time for all points on Earth. Time zones are assigned to each 15° band of longitude. The 48 contiguous U.S. States and Canada share four standard time zones, known as Eastern, Central, Mountain, and Pacific:

- The Eastern Standard Time Zone is near 75° west longitude, which passes close to Philadelphia, and is 5 hours earlier than GMT.
- The Central Standard Time Zone is near 90° west longitude, which passes through Memphis, Tennessee, and is 6 hours earlier than GMT.
- The Mountain Standard Time Zone is near 105° west longitude, which passes through Denver, Colorado, and is 7 hours earlier than GMT.
- The Pacific Standard Time Zone is near 120° west longitude, which passes through Lake Tahoe in California, and is 8 hours earlier than GMT.

Most of Alaska is in the Alaska Time Zone, which is 9 hours earlier than GMT. Hawaii and some of the Aleutian Islands are in the Hawaii-Aleutian Time Zone, which is 10 hours earlier than GMT.

Eastern Canada is in the Atlantic Time Zone, which is 4 hours earlier than GMT. The residents of Newfoundland assert that their island, which lies between 53° and 59° west longitude, would face dark winter afternoons if it were 4 hours earlier than GMT, like the rest of eastern Canada, and dark winter mornings if it were 3 hours earlier than GMT. Therefore, Newfoundland is 3½ hours earlier than GMT.

Before standard time zones were created, each locality set its own time, usually that kept by a local jeweler. When railroads became the main cross-country transportation during the nineteenth century, each rail company kept its own time, normally that of the largest city it served. Train timetables listed two sets of arrival and departure times, one for local time and one for railroad company time. Railroad stations had one clock for local time and a separate clock for each of the railroad companies using the station.

To reduce the confusion from the multiplicity of local times, the railroads urged adoption of standard time zones. Standard time zones were established in the United States in 1883 and in the rest of the world following the international meridian conference in Washington, D.C., in 1884. At noon on November 18, 1883, time stood still in the United States so that each locality could adjust to the new standard time zones. In New York City, for example, time stopped for 3 minutes and 58 seconds to adjust to the new Eastern Standard Time.

When you cross the International Date Line, which, for the most part, follows 180° longitude, you move the clock back 24 hours, or one entire day, if you are heading eastward toward America. You turn the clock ahead 24 hours if you are heading westward toward Asia.

To see the need for the International Date Line, try counting the hours around the world from the time zone in which you live. As you go from west to east, you add 1 hour for each time zone. When you return to your starting point, you will reach the absurd conclusion that it is 24 hours later in your locality than it really is. Therefore, when the time in New York City is 2 PM, it is 7 AM in London, 8 PM in Rome, 9 PM in Jerusalem, 10 PM in Moscow, 3 AM Monday in Singapore, and 5 AM Monday in Sydney, Australia. Continuing farther east, it is 7 AM Monday in Wellington, New Zealand—but when you get to Honolulu, it is 9 AM Sunday, because the International Date Line lies between New Zealand and Hawaii.

The International Date Line for the most part follows 180° longitude. However, in 1997, Kiribati, a collection of small islands in the Pacific Ocean, moved the International Date Line 3,000 kilometers (2,000 miles) to its eastern border near 150° west longitude. As a result, Kiribati is the first country to see each day’s sunrise. Kiribati hoped that this feature would attract tourists to celebrate the start of the new millennium on January 1, 2000 (or January 1, 2001, when sticklers pointed out the new millennium really began). But it did not.

FIGURE 1-13 Time zones. Longitude plays an important role in calculating time. Earth as a sphere is divided into 360° of longitude (the degrees from 0° to 180° west longitude, plus the degrees from 0° to 180° east longitude). As Earth rotates eastward, any place to the east of you always passes “under” the Sun earlier. Thus as you travel eastward from the prime meridian, you are “catching up” with the Sun, so you must turn your clock ahead from GMT by 1 hour for each 15°. If you travel westward from the prime meridian, you are “falling behind” the Sun, so you turn your clock back from GMT by 1 hour for each 15°.

The eastern United States, which is near 75° west longitude, is therefore 5 hours earlier than GMT (the 75° difference between the prime meridian and 75° west longitude, divided by 15° per hour, equals 5 hours). Thus when the time is 11 AM GMT, the time in the eastern United States is 5 hours earlier, or 6 AM.

Each 15° band of longitude is assigned to a standard time zone.
language, an economic activity such as production of a particular crop, or an environmental property such as climate. In a formal region the selected characteristic is present throughout.

Some formal regions are easy to identify, such as countries or local government units. Montana is an example of a formal region, characterized with equal intensity throughout the state by a government that passes laws, collects taxes, and issues license plates. The formal region of Montana has clearly drawn and legally recognized boundaries, and everyone living within them shares the status of being subject to a common set of laws.

In other kinds of formal regions a characteristic may be predominant rather than universal. For example, the North American wheat belt is a formal region in which wheat is the most commonly grown crop, but other crops are grown there as well. And the wheat belt can be distinguished from the corn belt—a region where corn is the most commonly grown crop.

Similarly, we can distinguish formal regions within the United States characterized by a predominant voting for Republican candidates, although Republicans do not get 100 percent of the votes in these regions—nor in fact do they always win (Figure 1-14, left). However, in a presidential election, the candidate with the largest number of votes receives all of the electoral votes of a state, regardless of the margin of victory. Consequently, a state that usually has Democratic electors can be considered a Democratic state (Figure 1-14, right).

Geographers typically identify formal regions to help explain broad global or national patterns, such as variations in religions and levels of economic development. The characteristic selected to distinguish a formal region often illustrates a general concept rather than a precise mathematical distribution.

A cautionary step in identifying formal regions is the need to recognize the diversity of cultural, economic, and environmental factors, even while making a generalization. Problems may arise because a minority of people in a region speak a language, practice a religion, or possess resources different from those of the majority. People in a region may play distinctive roles in the economy and hold different positions in society based on their gender or ethnicity.

FUNCTIONAL REGION. A functional region, also called a nodal region, is an area organized around a node or focal point. The characteristic chosen to define a functional region dominates at a central focus or node and diminishes in importance outward. The region is tied to the central point by transportation or communication systems or by economic or functional associations.

Geographers often use functional regions to display information about economic areas. The region’s node may be a shop or service, and the boundaries of the region mark the limits of the trading area of the activity. People and activities may be attracted to the node, and information may flow from the node to the surrounding area.

An example of a functional region is the reception area of a television station. A television station’s signal is strongest at the center of its service area, becomes weaker at the edge, and eventually can no longer be distinguished from snow (Figure 1-15). At some distance from the center, more people are watching a station originating in another city. That place is the boundary between the nodal regions of the two TV market areas.

Other examples of functional regions include the circulation area of a newspaper and the trading area of a department store. A newspaper dominates circulation figures in the city in which it is published. Farther away from the city, fewer people read that newspaper, whereas more people read a newspaper published in a neighboring city. A department store attracts fewer customers from the edge of a trading area, and beyond that edge customers will most likely choose to shop elsewhere.

New technology is breaking down traditional functional regions. Television stations are broadcast to distant places by cable or satellite. Newspapers such as USA Today, The Wall Street Journal, and The New York Times are composed in one place, transmitted by satellite to printing machines in other places, and delivered to yet other places by airplane, truck, or the Internet. Customers can shop at distant stores by mail or the Internet.

VERNACULAR REGION. A vernacular region, or perceptual region, is a place that people believe exists as part of their cultural identity. Such regions emerge from people’s
informal sense of place rather than from scientific models developed through geographic thought.

A useful way to identify a perceptual region is to get someone to draw a mental map, which is an internal representation of a portion of Earth’s surface. A mental map depicts what an individual knows about a place, containing personal impressions of what is in a place and where places are located. A student and a professor are likely to have different mental maps of a college campus, based on differences in where they work, live, and eat, and a senior is likely to have a more detailed and “accurate” map than a first-year student.

As an example of a vernacular region, Americans frequently refer to the South as a place with environmental, cultural, and economic features perceived to be quite distinct from the rest of the United States (Figure 1-16). Many of these features can be measured. Economically, the South is a region of high cotton production and low high school graduation rates. Culturally, the South includes the states that joined the Confederacy during the Civil War and where Baptist is the most prevalent religion. Environmentally, the South is a region where the last winter frost occurs in March, and rainfall is more plentiful in winter than in summer. Southerners and other Americans alike share a strong sense of the American South as a distinctive place that transcends geographic measurement. The perceptual region known as the South is a source of pride to many Americans—and for others it is a place to avoid.

Spatial Association

A region can be constructed to encompass an area of widely varying scale, from a very small portion of Earth to a very large portion. Different conclusions may be reached concerning a region’s characteristics depending on its scale. Consider the percentage of Americans who die each year from cancer. Death rates vary widely among scales within the United States (Figure 1-17):

- At the scale of the United States, the Great Lakes and South regions have higher levels of cancer than the West.
- At the scale of the state of Maryland, the eastern region has a higher level of cancer than the western region.
- At the scale of the city of Baltimore, Maryland, lower levels of cancer are found in the northern region.

Maps showing regions of high and low cancer rates do not communicate useful information to someone who knows little about the regions. To explain why regions possess distinctive features, such as a high cancer rate, geographers try to identify cultural, economic, and environmental factors that display similar spatial distributions. Geographers conclude that factors with similar distributions have spatial association. By integrating other spatial information about people, activities, and environments, we can begin to see factors that may be associated with regional differences in cancer.

At the national scale, the Great Lakes region may have higher cancer rates in part because the distribution of cancer is
In everyday language we think of culture as the collection of novels, paintings, symphonies, and other works produced by talented individuals. A person with a taste for these intellectual outputs is said to be “cultured.” Intellectually challenging culture is often distinguished from popular culture, such as television programs. Culture also refers to small living organisms, such as those found under a microscope or in yogurt. Agriculture is a term for the growing of living material at a much larger scale than in a test tube.

The origin of the word culture is the Latin cultus, which means “to care for.” Culture is a complex concept because “to care for” something has two very different meanings:

- To care about—to adore or worship something, as in the modern word cult.
- To take care of—to nurse or look after something, as in the modern word cultivate.

Geography looks at both of these facets of the concept of culture to see why each region in the world is unique.

When geographers think about culture, they may be referring to either one of the two main meanings of the concept.

Some geographers study what people care about (their ideas, beliefs, values, and customs), whereas other geographers emphasize what people take care of (their ways of earning a living and obtaining food, clothing, and shelter).

WHAT PEOPLE CARE ABOUT. Geographers study why the customary ideas, beliefs, and values of a people produce a distinctive culture in a particular place. Especially important cultural values derive from a group’s language, religion, and ethnicity. These three cultural traits are both an excellent way of identifying the location of a culture and the principal means by which cultural values become distributed around the world.

Language is a system of signs, sounds, gestures, and marks that have meanings understood within a cultural group. People communicate the cultural values they care about through language, and the words themselves tell something about where different cultural groups are located. The distribution of speakers of different languages and reasons for the distinctive distribution are discussed in Chapter 5.

Religion is an important cultural value because it is the principal system of attitudes, beliefs, and practices through which people worship in a formal, organized way. As discussed in Chapter 6, geographers look at the distribution of religious groups around the world and the different ways that the various groups interact with their environment.

Ethnicity encompasses a group’s language, religion, and other cultural values, as well as its physical traits. A group possesses these cultural and physical characteristics as a product of spatially associated with the distribution of factories. Residents of the South may have high cancer rates because, with lower levels of education and income, they may be less aware of the risks associated with activities such as smoking and less able to afford medical care to minimize the risk of dying from cancer.

Similarly, at the state scale, variations in regions may be associated with a combination of economic, cultural, and environmental factors. Baltimore City may have higher cancer rates because of a concentration of people with lower levels of income and education. People living in the rural Eastern Shore region may be exposed to runoff of chemicals from farms into the nearby Chesapeake Bay, as well as discharges carried by prevailing winds from factories further west.

At the urban scale, again, a combination of economic, cultural, and environmental factors may form a spatial association with the distribution of cancer. The ZIP codes on the north side of Baltimore City contain a higher percentage of people with high incomes, and are further from the city’s factories and port facilities.

Regional Integration of Culture

In thinking about why each region on Earth is distinctive, geographers refer to culture, which is the body of customary beliefs, material traits, and social forms that together constitute the distinct tradition of a group of people. Geographers distinguish groups of people according to important cultural characteristics, describe where particular cultural groups are distributed, and offer reasons to explain the observed distribution.

In everyday language we think of culture as the collection of novels, paintings, symphonies, and other works produced by
its common traditions and heredity. As addressed in Chapter 7, geographers find that problems of conflict and inequality tend to occur in places where more than one ethnic group inhabits and seeks to organize the same territory.

WHAT PEOPLE TAKE CARE OF. The second element of culture of interest to geographers is production of material wealth—the food, clothing, and shelter that humans need in order to survive and thrive. All people consume food, wear clothing, build shelter, and create art, but different cultural groups obtain their wealth in different ways.

Geographers divide the world into regions of more (or relatively) developed countries (abbreviated MDCs), and regions of less developed (or developing) countries (abbreviated LDCs). Regions of MDCs include North America, Europe, and Japan, and regions of LDCs include sub-Saharan Africa, the Middle East, East Asia, South Asia, Southeast Asia, and Latin America. Various shared characteristics—such as per capita income, literacy rates, televisions per capita, and hospital beds per capita—distinguish regions of MDCs and regions of LDCs. These differences are reviewed in Chapter 9.

Possession of wealth and material goods is higher in MDCs because of different types of economic activities than those in LDCs. Most people in LDCs are engaged in agriculture, whereas most people in MDCs earn their living through manufacturing products or performing services in exchange for wages. This fundamental economic difference between MDCs and LDCs is discussed in more detail in Chapters 10 through 13.

Geographers are also interested in the political institutions that protect material artifacts, as well as cultural values. The world is organized into a collection of countries, or states, controlled by governments put in place through various representative and unrepresentative means. A major element of a group’s cultural identity is its citizenship, the country or countries that it inhabits and in which it pays taxes, votes, and otherwise participates in the administration of space.

**FIGURE 1-17** Spatial association. On the national scale, the Great Lakes and South regions have higher cancer rates than the Western region. On the scale of the state of Maryland, the eastern region has a higher cancer rate than the western region. On the urban scale, southern and northwestern neighborhoods of Baltimore City have higher cancer rates than northeastern ones. Geographers try to understand the reason for these variations.
Because geographers are trained in both social and physical sciences, they are particularly well equipped to understand interactions between people and their environment. An example is the devastation in the southern United States after Hurricane Katrina in 2005.

Physical geography concepts explain the process by which hurricanes, such as Katrina, form in the Atlantic Ocean during the late summer and autumn and gather strength over the warm waters of the Gulf of Mexico. When it passes over land, a hurricane can generate a powerful storm surge that floods low-lying areas (Figure 1-18, left).

It is here that physical and human geography intersect. Katrina caused massive damage, in part because it made landfall near heavily populated areas, including the cities of Biloxi and Gulfport, Mississippi; Mobile, Alabama; and New Orleans, Louisiana. In an effort to protect these low-lying cities from flooding, government agencies constructed a complex system of levees, dikes, seawalls, canals, and pumps. The experience of Katrina proved that humans are not able to control and tame all of the forces of nature.

Human geographers are especially concerned with the uneven impact of destruction. Hurricane Katrina's victims were primarily poor, African American, and older individuals (Figure 1-18, center). They lived in the lowest-lying areas, most vulnerable to flooding, and many lacked transportation, money, and information that would have enabled them to evacuate in advance of the storm.

The wealthy portions of New Orleans, such as tourist attractions like the French Quarter, were spared the worst because they were located on slightly higher ground. The slow and incompetent response to the destruction by local, state, and federal emergency teams was attributed by many analysts to the victims’ lack of a voice in the political, economic, and social life of New Orleans and other impacted communities.

Inequalities persist several years after the hurricane (Figure 1-18, right). In 2009, four years after the hurricane, more than 90 percent of householders in predominantly white areas were back in their homes, as measured by whether they were receiving mail. In contrast, less than two-thirds of the households in several predominantly African American neighborhoods were receiving mail.

![Figure 1-18](image_url) Cultural ecology: New Orleans after Hurricane Katrina. From a physical geography perspective, 80 percent of New Orleans was underwater after the city’s flood-protection levees broke (left). The 20 percent that was not flooded was land at slightly higher elevations, including the leading tourist destinations in the Vieux Carré (French Quarter). From a social science perspective, at the time of the hurricane two-thirds of the population of New Orleans was African American (middle). However, the population in the area that was not flooded was less than one-fourth African American. The percentage of homes that have been fixed up and reoccupied since the hurricane is lower in the areas that had relatively large African American populations (right).
As discussed in Chapter 8, cultural groups in the modern world are increasingly asserting their right to organize their own affairs at the local scale rather than submit to the control of other cultural groups. Political problems are found in places where the area occupied by a cultural group does not coincide with the boundaries of a country.

Cultural Ecology: Integrating Culture and Environment

In constructing regions, geographers consider environmental as well as cultural factors. Distinctive to geography is the importance given to relationships between culture and the natural environment. Different cultural groups modify the natural environment in distinctive ways to produce unique regions. The geographic study of human–environment relationships is known as cultural ecology.

Pioneering nineteenth-century German geographers Alexander von Humboldt (1769–1859) and Carl Ritter (1779–1859) urged human geographers to adopt the methods of scientific inquiry used by natural scientists. They argued that the scientific study of social and natural processes is fundamentally the same. Natural scientists have made more progress in formulating general laws than have social scientists, so an important goal of human geographers is to discover general laws.

According to Humboldt and Ritter, human geographers should apply laws from the natural sciences to understanding relationships between the physical environment and human actions. Humboldt and Ritter concentrated on how the physical environment caused social development, an approach called environmental determinism.

Other influential geographers adopted environmental determinism in the late nineteenth and early twentieth centuries. Friedrich Ratzel (1844–1904) and his American student, Ellen Churchill Semple (1863–1932), claimed that geography was the study of the influences of the natural environment on people.

Another early American geographer, Ellsworth Huntington (1876–1947), argued that climate was a major determinant of civilization. For instance, according to Huntington, the temperate climate of maritime northwestern Europe produced greater human efficiency as measured by better health conditions, lower death rates, and higher standards of living.

HUMAN AND PHYSICAL FACTORS. To explain relationships between human activities and the physical environment in a region, modern geographers reject environmental determinism in favor of possibilism. According to possibilism, the physical environment may limit some human actions, but people have the ability to adjust to their environment. People can choose a course of action from many alternatives in the physical environment. Humans endow the physical environment with cultural values by regarding it as a collection of resources, which are substances that are useful to people, economically and technologically feasible to access, and socially acceptable to use.

For example, the climate of any location influences human activities, especially food production. From one generation to the next, people learn that different crops thrive in different climates—rice requires plentiful water, whereas wheat survives on limited moisture and actually grows poorly in very wet environments. On the other hand, wheat is more likely than rice to be grown successfully in colder climates. Thus, under possibilism, it is possible for people to choose the crops they grow and to be compatible with their environment.

Human geographers use this cultural ecology, or human–environment, approach to explain many global issues. For example, world population growth is a problem if the number of people exceeds the capacity of the physical environment to produce food. However, people can adjust to the capacity of the physical environment by controlling their numbers, adopting new technology, consuming different foods, migrating to new locations, and taking other actions.

Some human impacts on the environment are casual, and some are based on deep-seated cultural values. Why do we plant our front yard with grass, water it to make it grow, mow it to keep it from growing tall, and impose fines on those who fail to mow often enough? Why not let dandelions grow or pour concrete instead? Why does one group of people consume the fruit from deciduous trees and chop down the conifers for building materials, whereas another group chops down the deciduous trees for furniture while preserving the conifers as religious symbols?

A people's level of wealth can also influence its attitude toward modifying the environment. A farmer who possesses a tractor may regard a hilly piece of land as an obstacle to avoid, but a poor farmer with a hoe may regard hilly land as the only opportunity to produce food for survival through hand cultivation.

PHYSICAL PROCESSES: CLIMATE. Human geographers need some familiarity with global environmental processes to understand the distribution of human activities, such as where people live and how they earn a living. Important physical processes include climate, vegetation, soil, and landforms.

Climate is the long-term average weather condition at a particular location. Geographers frequently classify climates according to a system developed by German climatologist Vladimir Köppen. The modified Köppen system divides the world into five main climate regions that are identified by the letters A through E as well as by names:

- A Tropical Climates
- B Dry Climates
- C Warm Mid-Latitude Climates
- D Cold Mid-Latitude Climates
- E Polar Climates

The modified Köppen system divides the five main climate regions into several subtypes (Figure 1-19). For all but the B climate, the basis for the subdivision is the amount of precipitation and the season in which it falls. For the B climate, subdivision is made on the basis of temperature and precipitation.
Humans have a limited tolerance for extreme temperature and precipitation levels and thus avoid living in places that are too hot, too cold, too wet, or too dry. Compare the map of global climate to the distribution of population (see Figure 2-3). Relatively few people live in the Dry (B) and Polar (E) climate regions.

The climate of a particular location influences human activities, especially production of the food needed to survive. People in parts of the A climate region, especially southwestern India, Bangladesh, and the Myanmar (Burma) coast, anxiously await the annual monsoon rain, which is essential for successful agriculture and provides nearly 90 percent of India’s water supply (Figure 1-20). For most of the year, the region receives dry, somewhat cool air from the northeast. In June, the wind direction suddenly shifts, bringing moist, warm, southwesterly air, known as the monsoon, from the Indian Ocean. The monsoon rain lasts until September. In years when the monsoon rain is delayed or fails to arrive—in recent decades, at least one-fourth of the time—agricultural output falls and famine threatens in the countries of South Asia, where nearly 20 percent of the world’s people live. The monsoon rain is so important in India that the words for “year,” “rain,” and “rainy season” are identical in many local languages.

**PHYSICAL PROCESSES: VEGETATION.** Plant life covers nearly the entire land surface of Earth. Earth’s land vegetation includes four major forms of plant communities, called biomes. Their location and extent are influenced by both climate and human activities. Vegetation and soil, in turn, influence the types of agriculture that people practice in a particular region. The four main biomes are forest, savanna, grassland, and desert.

- **Forest biome.** Trees form a continuous canopy over the ground; grasses and shrubs may grow beneath the cover. The forest biome covers a large percentage of Earth’s surface, including much of North America, Europe, and Asia, as well as tropical areas of South America, Africa, and Southeast Asia.
- **Savanna biome.** The trees do not form a continuous canopy, and the resultant lack of shade allows grass to grow. Savanna covers large areas of Africa, South Asia, South America, and Australia.
- **Grassland biome.** Land is covered by grass rather than trees; few trees grow in the region because of low precipitation. Early explorers from northern Europe and eastern North America regarded the American prairies—the

![Figure 1-19 Climate regions](https://via.placeholder.com/150)
world’s most extensive grassland area—to be uninhabitable because of the lack of trees with which to build houses, barns, and fences. However, modern cultivation of wheat and other crops has turned the grasslands into a very productive region.

- **Desert biome.** Although many desert areas have essentially no vegetation, the region contains dispersed patches of plants adapted to dry conditions. Vegetation is often sufficient for the survival of small numbers of animals.

**PHYSICAL PROCESSES: SOIL.** Soil, the material that forms on Earth’s surface, is the thin interface between the air and the rocks. Not merely dirt, soil contains the nutrients necessary for successful growth of plants, including those useful to humans. The U.S. Comprehensive Soil Classification System divides global soil types into twelve orders, according to the characteristics of the immediate surface soil layers and the subsoil. The orders are subdivided into suborders, great groups, subgroups, families, and series. More than 12,000 soil types have been identified in the United States alone. Human geographers are concerned with the destruction of the soil that results from a combination of natural processes and human actions. Two basic problems contribute to the destruction of soil—erosion and depletion of nutrients.

Erosion occurs when the soil washes away in the rain or blows away in the wind. To reduce the erosion problem, farmers reduce the amount of plowing, plant crops whose roots help bind the soil, and avoid planting on steep slopes.

Nutrients are depleted when plants withdraw more nutrients than natural processes can replace. Each type of plant withdraws certain nutrients from the soil and restores others. Repeated harvesting of the same type of crop year after year can remove certain nutrients and reduce the soil’s productivity. To minimize depletion, farmers in MDCs sometimes plant crops that offer no economic return but restore nutrients to the soil and keep the land productive over a longer term. Farmers also restore nutrients to the soil by adding fertilizers, either natural or synthetic. Farmers in LDCs may face greater problems with depletion of nutrients because they lack knowledge of proper soil management practices and funds to buy fertilizer.

**PHYSICAL PROCESSES: LANDFORMS.** Earth’s surface features, or landforms, vary from relatively flat to mountainous. Geographers find that the study of Earth’s landforms—a science known as geomorphology—helps to explain the distribution of people and the choice of economic activities at different locations. People prefer living on flatter land, which generally is better suited for agriculture. Great concentrations of people and activities in hilly areas may require extensive effort to modify the landscape.

Topographic maps, published (for the United States) by the U.S. Geological Survey (USGS), show a remarkable detail of physical features, such as bodies of water, forests, mountains, valleys, and wetlands. They also show cultural features, such as buildings, roads, parks, farms, and dams. “Topos,” as they are called, are used by engineers, hikers, hunters, people seeking a homesite, and anyone who really needs to see the lay of the land. Geographers use topographic maps to study the relief and slope of localities. Relief is the difference in elevation between any two points, and it measures the extent to which an area is flat or hilly. The steepness of hills is measured by slope, which is the relief divided by the distance between two points. Figure 1-5 shows a portion of a USGS map for northern Mississippi, at the scale of 1:24,000. The brown lines on the map are contour lines that connect points of equal elevation above or below sea level. Contour lines are closer together to show steeper slopes and farther apart in flatter areas.

**Modifying the Environment**

Modern technology has altered the historic relationship between people and the environment. Humans now can modify a region’s physical environment to a greater extent than in the past. Geographers are concerned that people sometimes use modern technology to modify the environment insensitively. Human actions can deplete scarce environmental resources, destroy irreplaceable resources, and use resources inefficiently.

For example, air-conditioning has increased the attractiveness of living in regions with warmer climates. But the refrigerants in the air conditioners have also increased the amount of chlorofluorocarbons in the atmosphere, damaging the ozone layer that protects living things from UV rays and contributing to global warming.
warming. We explore the consequences of such use, abuse, and misuse of the environment in more detail in Chapter 14.

Few regions have been as thoroughly modified by humans as the Netherlands and Florida’s Everglades. Because more than half of the Netherlands lies below sea level, most of the country today would be under water if it were not for massive projects to modify the environment by holding back the sea. Meanwhile, the fragile landscape of south Florida has been altered in insensitive ways.

**THE NETHERLANDS: SENSITIVE ENVIRONMENTAL MODIFICATION.** The Dutch have a saying that “God made Earth, but the Dutch made the Netherlands.” The Dutch have modified their environment with two distinctive types of construction projects—polders and dikes.

A **polder** is a piece of land that is created by draining water from an area. Polders, first created in the thirteenth century, were constructed primarily by private developers in the sixteenth and seventeenth centuries and by the government during the past 200 years. All together, the Netherlands has 6,500 square kilometers (2,600 square miles) of polders, comprising 16 percent of the country’s land area (Figure 1-21). The Dutch government has reserved most of the polders for agriculture to reduce the country’s dependence on imported food. Some of the polders are used for housing, and one contains Schiphol, one of Europe’s busiest airports.

The second distinctive modification of the landscape in the Netherlands is the construction of massive dikes to prevent the North Sea, an arm of the Atlantic Ocean, from flooding much of the country. The Dutch have built dikes in two major locations—the Zuider Zee project in the north and the Delta Plan project in the southwest.

The Zuider Zee, an arm of the North Sea, once threatened the heart of the Netherlands with flooding. A dike completed in 1932 caused the Zuider Zee to be converted from a saltwater sea to a freshwater lake. The newly created body of water was named the IJsselmeer, or Lake IJssel, because the IJssel River now flows into it. Some of the lake has been drained to create several polders, encompassing an area of 1,600 square kilometers (620 square miles).

A second ambitious project in the Netherlands is the Delta Plan in the southwestern part of the country. Flowing through the Netherlands are several important rivers, including the Rhine (Europe’s busiest river), the Maas (known as the Meuse in France), and the Scheldt (known as the Schelde in Belgium). As these rivers flow into the North Sea, they split into many branches and form a low-lying delta that is vulnerable to flooding. After a devastating flood in January 1953 killed nearly 2,000 people, the Dutch people have considerably altered the site of the Netherlands through creation of polders and dikes. The first step in making a polder is to build a wall encircling the site, which is still underwater. Then the water inside the walled area is pumped from the site into either nearby canals or the remaining portion of the original body of water. Once dry, the site is prepared for human activities.

In the late nineteenth century, Dutch engineer Cornelis Lely proposed an ambitious project to seal off the Zuider Zee permanently from the North Sea, the ultimate source of the floodwaters. In accordance with Lely’s plan, a dike was built, 32 kilometers (20 miles) long, across the mouth of the Zuider Zee to block the flow of North Sea water and create Lake IJssel.

After a devastating flood in 1953, the Delta Plan built dikes to close off most of the waterways in the southwestern part of the country. Because Rotterdam, Europe’s largest port, is located nearby, some of the waterways were kept open. The Delta Works are barely visible in the background of the photograph of a polder.
people, the Delta Plan called for the construction of several dams to close off most of the waterways from the North Sea. The project took 30 years to build and was completed in the mid-1980s.

Once these two massive projects were finished, attitudes toward modifying the environment changed in the Netherlands. The Dutch scrapped plans to build additional polders in the IJsselmeer in order to preserve the lake's value for recreation.

The Dutch are deliberately breaking some of the dikes to flood fields. A plan adopted in 1990 called for returning 263,000 hectares (650,000 acres) of farms to wetlands or forests. Widespread use of insecticides and fertilizers on Dutch farms has contributed to contaminated drinking water, acid rain, and other environmental problems.

Global warming could threaten the Netherlands by raising the level of the sea around the country by between 20 and 58 centimeters (8 and 23 inches) within the next 100 years. Rather than build new dikes and polders, the Dutch have become world leaders in reducing the causes of global warming by acting to reduce industrial pollution and increase solar and wind power use, among other actions.

SOUTH FLORIDA: NOT-SO-SENSITIVE ENVIRONMENTAL MODIFICATION. Sensitive environmental areas in South Florida include barrier islands along the Atlantic and Gulf coasts, the wetlands between Lake Okeechobee and the Everglades National Park, and the Kissimmee River between Lake Kissimmee and Lake Okeechobee (Figure 1-22). These lowlands have been modified less sensitively than those in the Netherlands.

The Everglades was once a very wide and shallow freshwater river 80 kilometers (50 miles) wide and 15 centimeters (6 inches) deep, slowly flowing south from Lake Okeechobee to the Gulf of Mexico. A sensitive ecosystem of plants and animals once thrived in this distinctive landscape, but much of it has been destroyed by human actions.

The U.S. Army Corps of Engineers built a levee around Lake Okeechobee during the 1930s, drained the northern one-third of the Everglades during the 1940s, diverted the Kissimmee River into canals during the 1950s, and constructed dikes and levees near Miami and Fort Lauderdale during the 1960s. The southern portion of the Everglades became a National Park. These modifications opened up hundreds of thousands of hectares of land for growing sugarcane and protected farmland as well as the land occupied by the growing South Florida population from flooding. But they had unintended consequences for South Florida’s environment.

Polluted water mainly from cattle grazing along the banks of the canals flowed into Lake Okeechobee, which is the source of fresh water for half of Florida's population. Fish in the lake began to die from the high levels of mercury, phosphorous, and other contaminants. The polluted water then continued to flow south into the National Park, threatening native vegetation such as sawgrass and endangering rare birds and other animals.

Meanwhile, Florida's barrier islands are home to several hundred thousand people. These barrier islands, as well as those elsewhere along the Atlantic and Gulf coasts between Maine and Texas, are essentially large sandbars that shield the mainland from flooding and storm damage. They are constantly being eroded and shifted from the force of storms and pounding surf, and after a major storm, large sections are sometimes washed away. Despite their fragile condition, the barrier islands are attractive locations for constructing homes and recreational facilities to take advantage of proximity to the seashore. Most of the barrier islands are linked with the mainland by bridge, causeway, or ferry service. To fight erosion along the barrier islands, people build seawalls and jetties, which are structures extending into the sea, but these projects result in more damage than protection. A seawall or jetty can prevent sand from drifting away, but by trapping sand along the up-current side, it causes erosion on the barrier islands on the down-current side.

A 2000 plan called for restoring the historic flow of water through South Florida while improving flood control and water quality. A 2008 plan called for the state to acquire hundreds of thousands of acres of land from sugarcane growers. But to date, few elements of the plans to restore the Everglades have been implemented. One-half of the Everglades has been lost to development. In an ironic reminder of the Dutch saying quoted earlier, Floridians say, “God made the world in six days, and the Army Corps of Engineers has been tinkering with it ever since.”

KEY ISSUE 3
Why Are Different Places Similar?

- Scale: From Local to Global
- Space: Distribution of Features
- Connections Between Places

Although accepting that each place or region on Earth is unique, geographers recognize that human activities are rarely confined to one location. Discussed in this section are three basic concepts—scale, space, and connections—that help geographers understand why two places or regions can display similar features.

Scale: From Local to Global

Geographers think about scale at many levels, from local to global. At a local scale, such as an urban neighborhood, geographers tend to see unique features. At the global scale, encompassing the entire world, geographers tend to see broad patterns.