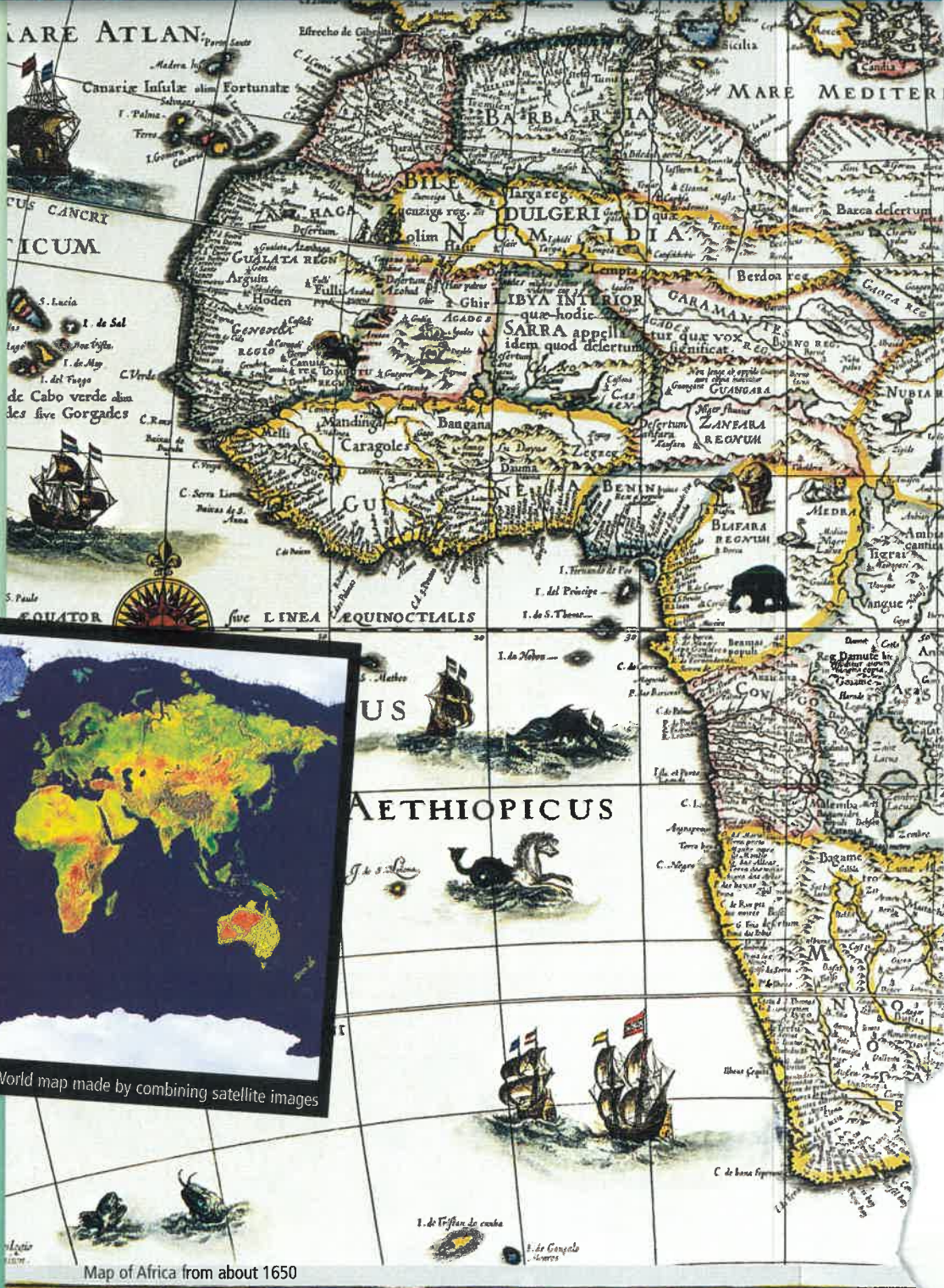


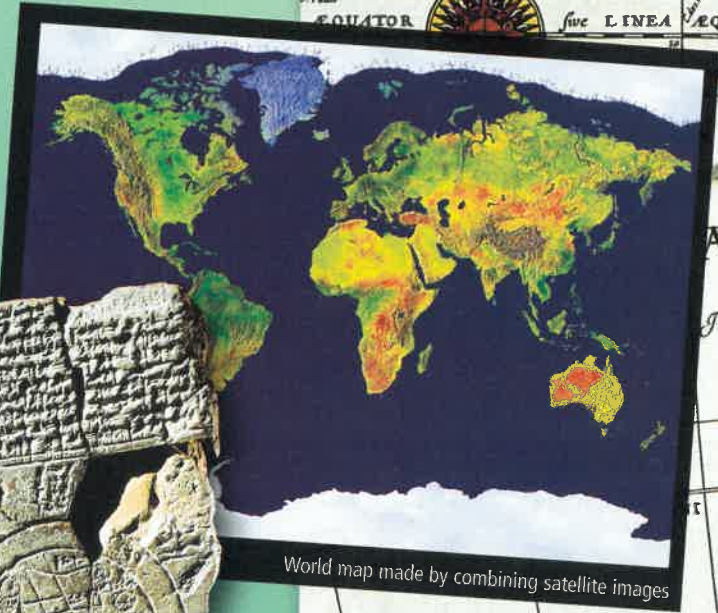
CHAPTER
1

Studying Geography

Geography covers more topics than you might think. In this chapter you will learn about the wide scope of geography. You will also become familiar with some of the geographer's basic tools.



Map of Africa from about 1650



World map made by combining satellite images



Babylonian plan of the world, 600s B.C.



Section 1

Themes and Essential Elements

READ TO DISCOVER

1. What are the two main branches of geography?
2. How do we use geography?
3. What are some ways we can organize our world and the study of geography?

Reading Strategy

TAKING NOTES Taking notes while you read will help you understand and remember the information in this section. Your notes will be useful for reviewing the material. Write down the headings in the section. As you read, fill in notes under each heading. Underline the most important details you find. Include key terms and their definitions.

DEFINE

geography
perspective
landscapes
cartography
meteorology
region
formal region
functional region
perception
perceptual regions

HOLT

Geography's Impact Video Series

Watch the video to understand the impact of studying geography.



What Is Geography?

Many people do not really know what **geography** is. Some people think geography is just memorizing lists of countries and state capitals. Other people think it is the study of rocks. Still others think geographers just look at maps and pictures of faraway places. However, there is much more to geography!

Geography is the study of everything on Earth, from rocks and rainfall to people and places. Geographers study how the natural environment influences people, how people's activities affect Earth, and how the world is changing. To do this, geographers look at many different things, including cities, cultures, plants, and resources. Geographers focus on where these things are or where related events happen.

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INTERPRETING THE VISUAL RECORD

Light shines through the shelter built by this Inuit man in Nunavut, Canada. How do you think the natural environment affects this person, and how do his activities affect Earth? How might his world be changing?



INTERPRETING THE VISUAL RECORD

Indonesian women sell fish at their local market. *What might the photo indicate about the physical and human landscapes in which these women live?*

Perspective—or the way a person looks at something—is an important part of learning about geography or any other subject. Geographers use a spatial perspective to study the world. That is, they look for patterns in where things are located on Earth and how they are arranged. Geographers then try to explain these patterns. They also look at a world that is shaped by **landscapes**. A landscape is the scenery of a place, including its physical, human, and cultural features. Geographers look at landscapes and try to explain what they see. For geographers the word *landscape* is almost magical. Each of us lives in a landscape. When studying world geography, we discover the amazing diversity of our world’s landscapes.

Geography has two main branches—human geography and physical geography. Those who study human geography look at the distribution and characteristics of the world’s people. They study where people live and work as well as their ways of life. They also look at how people make and trade things that they need to survive. The study of physical geography focuses on Earth’s natural environments. These include Earth’s landforms, water features, atmosphere, animals, plants, soils, and the processes that affect them. The interaction of people with their environment links human and physical geography together.

In this textbook you will use both human and physical geography to study the world. First, you will study an area’s natural environment. Then you will learn about the area’s human aspect and how it relates to the physical setting.

✓ **READING CHECK:** *The Uses of Geography* What are the two main branches of geography?

INTERPRETING THE VISUAL RECORD

Mount McKinley, the highest peak in North America, rises over Denali National Park and Preserve. Fireweed blooms in the foreground. *What questions might physical and human geographers ask about this place?*



Who Uses Geography?

Now that you know what geography is, you might be wondering, who uses geography? You do. In fact, people all over the world use geography every day. We use it when we find our way to school or work and go on trips. We also use it when we watch the news on television and read about other countries. We think geographically every time we decide where to go and how to get there.

Most jobs require an understanding of geography. For example, a restaurant owner must find a good location for his or her business. Politicians need to know the geography of their districts. They must also understand the issues that are important to people there. In addition, a number of professions rely heavily on specially trained geographers.

Subfields of Geography Geography has many different subfields. One of the most well known is **cartography**—the study of maps and mapmaking. Maps are important because they help geographers study locations. Although some maps are still drawn by hand, computers have completely changed mapmaking. Computers store information from satellite images, photographs, and other sources. A cartographer then creates a map on a computer. Cartographers work for companies that publish maps, atlases, newspapers, magazines, and books. They also work for city planning agencies and other areas of government.

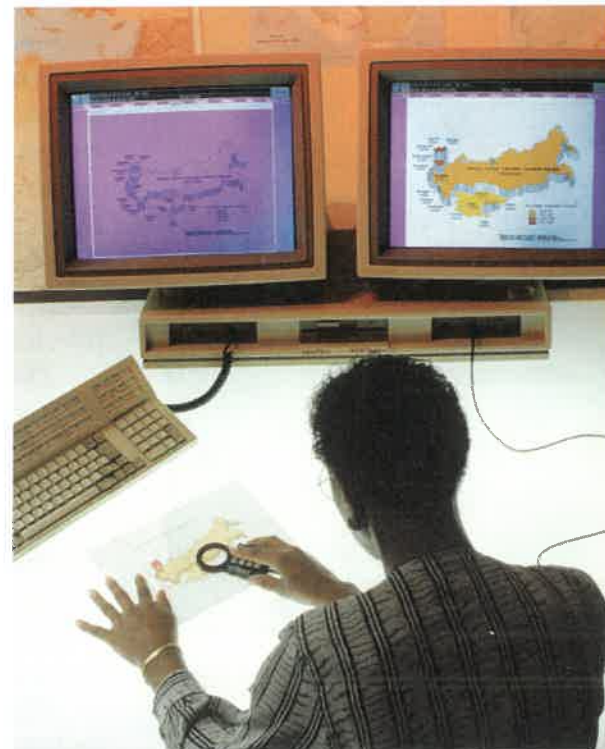
Another subfield of geography is **meteorology**—the study of weather. Meteorologists forecast how the weather will develop so that people know what to expect. You have probably watched these meteorologists, or weather forecasters, on local television.

Geographers at Work Many geographers work for governmental agencies. In fact, one of the largest employers of cartographers in the United States has been the United States Geological Survey (USGS). The USGS produces detailed maps of the whole country. Other agencies that hire geographers include the offices of most city, county, and state governments.

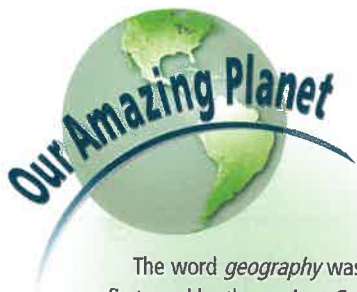
Many businesses hire geographers. Those geographers decide where to place new stores and plan shipping and trucking routes. They also help identify new markets. Geographers work in many different areas of business, such as tourism and travel and international sales.

Schools also hire geography teachers, who help people learn about the world. This knowledge is becoming more important as the different areas of the world become more closely linked. Geographic knowledge is also needed for good citizenship. Citizens who feel strongly about important geographic issues can try to influence public policies and decisions. Should we allow suburbs to be built over good farmland? Where should we put our garbage and dangerous materials? Helping citizens and governments find answers to these questions is the job of geographers.

✓ **READING CHECK:** *The Uses of Geography* What are some organizations and companies that employ geographers?



A technician scans a map to create a digital version.



The word *geography* was first used by the ancient Greek geographer Eratosthenes (er-uh-TAHS-thuh-nee-z). It comes from two Greek words—*geo*, meaning “Earth,” and *graphia*, which means “to describe.”

γεωγραφία



INTERPRETING THE VISUAL RECORD

The Piney Woods of East Texas qualifies as a formal region, mainly because of the pine trees that grow throughout the area. What other features might help define the Piney Woods?

How Do We Study Geography?

An important concept in geography is the idea of a **region**. A region is an area with one or more common features that make it different from surrounding areas. Cities, states, countries, and continents are examples. Organizing Earth’s surface into smaller regions makes it easier to study our complex world.

Regions are defined by their physical and human features. Physical features include the kinds of climate, river systems, soils, and vegetation you find there. Human features include the languages, religions, and trade networks of an area. Sometimes the boundaries of a region are clear. For example, the United States is a political region with clear boundaries. In other places, the boundaries are harder to set. For example, the Corn Belt is a farming region in the midwestern United States. However, the Corn Belt does not have clearly set boundaries. It stretches across a number of states. Exactly where the Corn Belt begins and ends is not clear.

Regions can be any size. Countries, deserts, and mountain ranges are examples of large regions. Smaller regions include suburbs and neighborhoods. Regions can also be divided into smaller areas called subregions. For example, the Great Plains is a subregion within North America.

✓ **READING CHECK:** **Places and Regions** What are some physical and human features that can define a region?

Types of Regions Geographers define regions in three basic ways. The first is a **formal region**. A formal region has one or more common features that make it different from surrounding areas. An example is the Sahel in Africa. This dry region lies between the Sahara, a vast desert to the north, and wetter forested areas to the south.

Formal regions can be based on almost any feature or combination of features. Those features might include population, income levels, crops, temperature, or rainfall. Physical features might define a formal region, such as the Rocky Mountains in the western United States. Economic features also might define such a region. For example, an industrial area in the northeastern and midwestern United States is also a formal region. This region was once called the Rust Belt because so many old factories there had shut down. Today new industries have revived the region’s economy.

The second type of region is a **functional region**. These are made up of different places that are linked together and function as a unit. For example, a city transit system is a functional region. It includes many different places. However, the flow of people, trains, and buses link those places together.

Many functional regions are organized around a central point. Surrounding areas are linked to this point. For example, shopping malls are centers of functional regions linked to surrounding neighborhoods. Cities are also examples of these centers. They connect to suburbs, areas in the country, and industry, which all function together.

The third type of region involves human **perception**—our awareness and understanding of the environment around us. People view regions very differently. Our views are influenced not only by what is in a region but also by what is in us. Our ways of life and experiences influence how we perceive the world. Therefore, **perceptual regions** are regions that reflect human feelings



INTERPRETING THE VISUAL RECORD *The Amazon River system in South America, at the left, is a functional region. Places within it are linked by the river's flow. For many Americans, southern California, at the right, is a perceptual region. What elements of southern California as a perceptual region are illustrated in this photo of the beach at Venice?*

and attitudes. For example, “back home” is a perceptual region for most people. However, it may be hard to define exactly. The U.S. Midwest may be easier to define. The South—a region sometimes called Dixie—is another example. Many people perceive these areas to be distinct regions. These areas have their own special features that make them different from anywhere else. Yet people may view—or perceive—those features in differing ways.

✓ **READING CHECK:** *Places and Regions* What are the three types of regions?

The Five Themes and Six Essential Elements The study of geography has long been organized according to five important themes. One theme, *location*, deals with the exact or relative spot of something on Earth. Another term for something's exact location on Earth's surface is its absolute location. Something's relative location is its position on Earth relative to other locations. *Place* includes the physical and human features of a location. *Human-environmental* interaction covers the ways people and environments interrelate with and affect each other. *Movement* involves how people and things change locations and the effects of these changes. *Region* organizes Earth into geographic areas with one or more shared characteristics.

By the early 1990s, some geographers felt that the 5 Themes were too broad. They created 18 Geography Standards and grouped them under 6 Essential Elements. The 18 Geography Standards include more detailed information about what geography is. The 6 Essential Elements serve as a bridge between the 5 Themes and the 18 Standards. The 6 Essential Elements will be used throughout this textbook.

Look at the chart below. It shows how each of the 5 Themes connects to the Essential Elements and the Standards. For example, the theme of Location is related to The World in spatial Terms and the first three Standards.

The last Essential Element—The Uses of Geography—covers the last two Standards. These key parts of geography were not covered by the 5 Themes. Essential Element 6 will help you see how geography has influenced the past, present, and future.

5 Themes of Geography

Location

Place

Regions

Movement

Human-
Environment
Interaction

6 Essential Elements

The World in
Spatial Terms

Places and
Regions

Physical
Systems

Human
Systems

Environment
and Society

The Uses of
Geography

18 Geography Standards

1. How to use maps and other tools
2. How to use mental maps to organize information
3. How to analyze the spatial organization of people, places, and environments
4. The physical and human characteristics of places
5. How people create regions to interpret Earth
6. How culture and experience influence people's perceptions of places and regions
7. The physical processes that shape Earth's surface
8. The distribution of ecosystems on Earth
9. The characteristics, distribution, and migration of human populations
10. The complexity of Earth's cultural mosaics
11. The patterns and networks of economic interdependence on Earth
12. The patterns of human settlement
13. The forces of cooperation and conflict
14. How human actions modify the physical environment
15. How physical systems affect human systems
16. The distribution and meaning of resources
17. How to apply geography to interpret the past
18. How to apply geography to interpret the present and plan for the future



Section 1 Review

Define geography, perspective, landscapes, cartography, meteorology, region, formal region, functional region, perception, perceptual regions

Reading for the Main Idea

1. **Places and Regions** What are examples of functional, formal, and perceptual regions?
2. **The Uses of Geography** What six essential elements are used to organize the study of geography?

Critical Thinking

3. **Contrasting** How is the study of human geography different from the study of physical geography?
4. **Making Generalizations and Predictions** What do you think a "geographical approach" to studying an issue might be?

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Organizing What You Know

5. Create a graphic organizer like the one shown below. Use it to identify some of the jobs that geographers have.



Section 2

Skill Building: Using the Geographer's Tools

READ TO DISCOVER

1. How do geographers and mapmakers organize our world?
2. What kinds of special maps do geographers use?
3. How do geographers use climate graphs and population pyramids?

Reading Strategy

READING ORGANIZER Before you read, create a spider map. Label the map Geographer's Tools. Create a leg for each main idea in the section. As you read the section, fill in the map with details that support each main idea. Include key terms and their definitions.

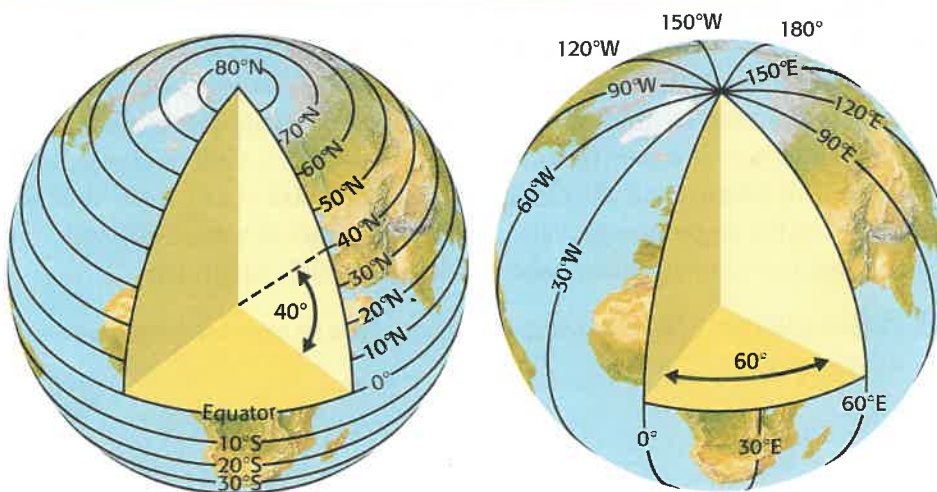
DEFINE

- | | |
|----------------|---------------------|
| grid | atlas |
| latitude | map projections |
| longitude | great-circle route |
| equator | compass rose |
| parallels | legend |
| meridians | contiguous |
| prime meridian | precipitation |
| degrees | topography |
| hemispheres | climate graphs |
| continents | population pyramids |

Organizing the Globe

We begin our study of geography by looking at a globe. A globe is a scale model of Earth. It is useful for looking at the whole planet or at large areas of its land and water surface. One of the first things you will notice on the globe on this page is a pattern of lines. These lines circle the globe in east-west and north-south directions. This pattern is called a **grid**. The grid is made up of lines of **latitude** and **longitude**. Lines of latitude are drawn in an east-west direction. Lines of longitude are drawn in a north-south direction. The intersection of these imaginary lines helps us find the exact or absolute location of places.

Latitude and Longitude



The illustration on the left shows lines of latitude. The north-south lines shown on the right are lines of longitude. Notice that lines of latitude are always the same distance apart.

NORTHERN HEMISPHERE



SOUTHERN HEMISPHERE



EASTERN HEMISPHERE



WESTERN HEMISPHERE



Lines of latitude measure distance north and south of the **equator**. The equator is an imaginary line that circles the globe halfway between Earth's North Pole and South Pole. Lines of latitude are also called **parallels**. This is because they are always parallel to the equator and each other. Lines of longitude are called **meridians**. They measure distance east and west of the **prime meridian**. This is an imaginary line drawn from the North Pole through Greenwich, England, to the South Pole. Parallels and meridians measure distances in **degrees**. The symbol for degrees is $^{\circ}$. Degrees are further divided into minutes, for which the symbol is $'$. There are 60 minutes in a degree.

As you can see on the globe on the previous page, parallels north of the equator are marked with an *N*. Those south of the equator are marked with an *S*. Lines of latitude range from 0° , for locations on the equator, to 90°N and 90°S , for locations at the North Pole and South Pole. Lines of longitude range from 0° on the prime meridian to 180° on a meridian in the mid-Pacific Ocean. Meridians west of the prime meridian to 180° are labeled with a *W*. Those east of the prime meridian are labeled with an *E*.

Hemispheres, Continents, and Oceans The globe's grid does more than help us locate places. Geographers also use those grid lines to organize the way we look at our world. For example, the equator divides the globe into two halves, or **hemispheres**. The half lying north of the equator is the Northern Hemisphere. The southern half is the Southern Hemisphere. The prime meridian and the 180° meridian divide the world into the Eastern Hemisphere and the Western Hemisphere. The prime meridian separates parts of Europe and Africa into two different hemispheres. To avoid this separation, some geographers divide the Eastern and Western Hemispheres in the Atlantic Ocean at 20°W . Doing so places all of Europe and Africa in the Eastern Hemisphere.

We can also organize our planet's land surface into seven large landmasses, called **continents**. There are seven continents: Africa, Antarctica, Asia, Australia, Europe, North America, and South America. Asia, the largest, is more than five times the size of Australia, the smallest. Landmasses smaller than continents and completely surrounded by water are called islands. Greenland is the world's largest island.

Geographers also organize Earth's water surface into separate areas. The largest area is the global ocean. Geographers further divide this ocean into four areas: the Atlantic Ocean, the Arctic Ocean, the Indian Ocean, and the Pacific Ocean. The Pacific is the largest ocean and the world's largest geographic feature. It is more than 12 times the size of the smallest ocean, the Arctic.

Smaller bodies of waters include seas, gulfs, and lakes. Gulfs and seas, such as the Gulf of Mexico and the Caribbean Sea, are areas of salt water that are connected to the larger oceans. Lakes are inland bodies of water. Although it is called a sea, the Caspian Sea in Asia is really the world's largest lake.

 **SKILLS CHECK:** *The World in Spatial Terms* What are some ways geographers organize our world?

INTERPRETING THE MAPS *In which hemispheres is the United States located? Which continents are located entirely within the Southern Hemisphere?*



This map, which is more than 3,000 years old, shows an ancient mining and quarrying area in southeastern Egypt.

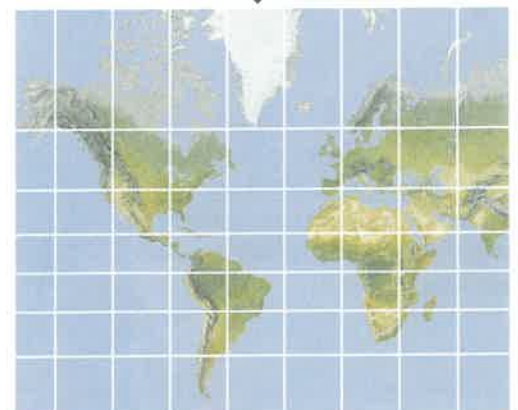
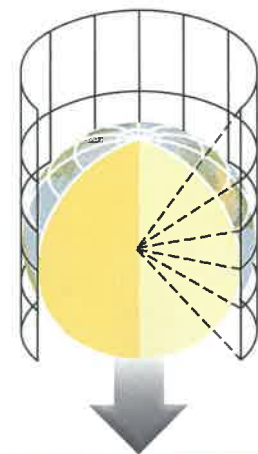
Making Maps

Globes are not the only useful visual tools for studying Earth. In organizing and identifying places in our world, geographers also use maps. Maps are flat representations of all or part of Earth's surface. A collection of maps in one book is called an **atlas**. You will find an atlas of world and regional maps at the front of this textbook.

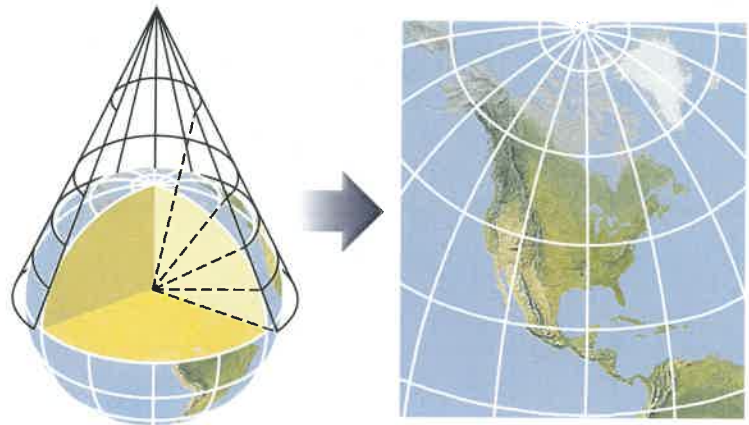
Mapmakers have different ways of presenting our round Earth on flat maps. These different ways are called **map projections**. Because our planet is round, all flat maps—no matter their projection—have some distortion. For example, some maps do not show the true sizes of landmasses. This is particularly true at higher latitudes. For example, on some maps Greenland—which lies mostly within the Arctic Circle—might appear larger than Australia, a continent. However, those maps might be useful because they show true direction and true shapes. Other maps show size in true proportions but distort shapes. Mapmakers must choose the type of projection that is best for their purposes. The most common projections are cylindrical, conic, and flat-plane.

Map Projections Maps with cylindrical projections are designed as if a cylinder has been wrapped around the globe. The cylinder touches the globe only at the equator. The meridians are pulled apart and are parallel to each other instead of meeting at the poles. This causes landmasses near the poles to appear larger than they really are.

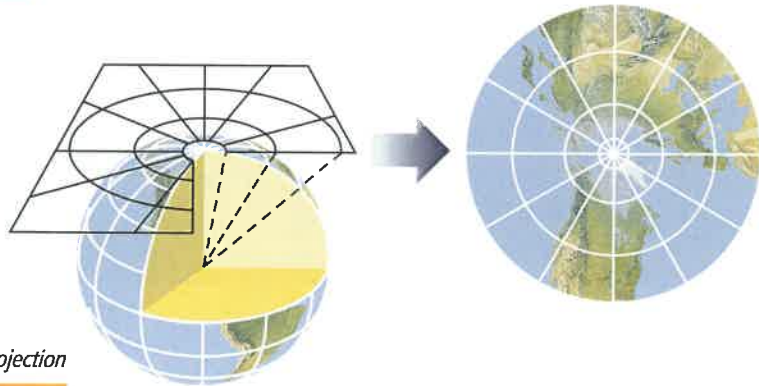
A Mercator map is a cylindrical projection. The Mercator map is useful for navigators because it shows true direction and shape. However, landmasses at high latitudes—such as Europe and North America—are exaggerated in size. They appear larger than they really are. Landmasses in lower latitudes may appear relatively smaller than they really are. (See the diagram.)



Cylindrical projection



Conic projection



Flat-plane projection

Conic projections are designed as if a cone has been placed over the globe. A conic projection is most accurate along the lines of latitude where it touches the globe. It retains almost true shapes and sizes of landmasses along those locations. Conic projections are most useful for areas that have long east-west dimensions, such as the United States and Russia.

Flat-plane maps are those that appear to touch the globe at one point, such as the North Pole or the South Pole. A flat-plane projection is useful for showing true direction for airplane pilots and ship navigators. It also shows true area sizes, but it distorts shapes.

Great-Circle Route Drawing a straight line on a flat map will not show the shortest route between two places. Remember that maps represent a round world on a flat plane. The shortest route between any two places on the planet is called a **great-circle route**. (See the illustrations on this page.) Airline pilots and ship captains use great-circle routes to help them navigate. You can see

Using great-circle routes saves time and fuel for travelers. Use your atlas to find more examples of how great circle routes shorten other trips, such as those between Canada and Japan.

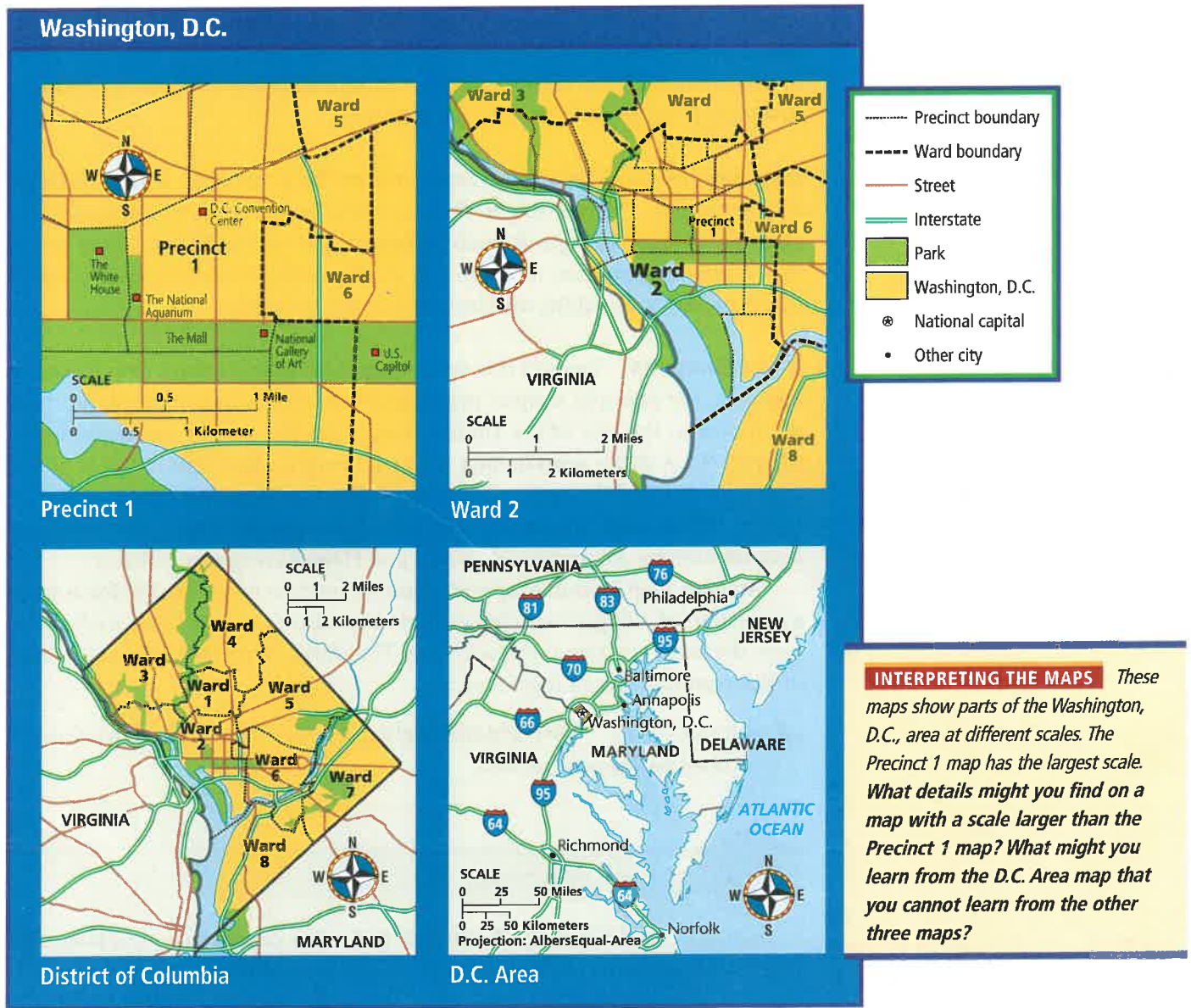


how a great-circle route shows the shortest distance between two points by using a round globe in your classroom or library.

SKILLS CHECK: *The World in Spatial Terms* What are three kinds of map projections that mapmakers use?

Understanding Map Elements

The study of geography involves more than simply looking at big places you see on a globe or map. It also involves looking at places at different scales—the size of an area and the level of detail that is shown. In fact, a map can show small areas, such as the floor plan of a building. It might show a neighborhood or a voting precinct. Maps can also show larger areas. For example, they might show whole cities, states, countries, continents, and oceans. You can see examples of maps at different scales throughout this textbook. For example, on this page are maps of Washington, D.C., and surrounding areas. Notice how details on each map change as the scale changes.





People probably made maps even before written languages existed. However, the earliest known map is one discovered on a clay tablet at a place called Nuzi in what is now Iraq. The map dates to about 2500 B.C.

Maps may show different details depending on scale. However, they usually have the same basic elements. This is because maps, in some ways, are like messages sent out in code. Cartographers provide basic map elements to help us translate these codes. Thus, we can understand the information, or message, in a map. Almost all maps have several common elements. They include a distance scale, a directional indicator, and a key. The key is a guide that identifies symbols. You can see these elements on the Washington, D.C., maps.

Distance Scales A map's distance scale helps us determine real distances between points on a map. Remember that maps of small areas can show more detail than maps of large areas. Because of this, scales on those maps can indicate short distances. Some might show just one or two miles or kilometers. Others might show smaller distances—even just hundreds of feet or meters. Maps showing large areas, such as state and country maps, must have scales that indicate longer distances. Those scales might show distances in tens or even hundreds of miles or kilometers.

Directional Indicators A directional indicator shows which directions on a map are north, south, east, and west. Some mapmakers use a “north arrow,” which points toward the North Pole. Most maps have north at the top. Maps in this textbook show direction with a **compass rose**. A compass rose has arrows that point to all four principal directions.

Legends A map's **legend**, or key, identifies the symbols on a map and what they represent. Legends might show symbols representing cities, roads, and other features. Some legends, such as those in this textbook's atlas, show colors that represent elevation, or height. In short, legends show colors or symbols that represent many different kinds of features on a map.

Other Elements You will find other important map elements as you use this textbook. For example, chapter maps have boxes that compare the physical size of an area to the size of the United States. (See the map at the beginning of Chapter 9.) A shape representing the area being studied is in red. It is placed over an outline of the **contiguous** United States. *Contiguous* means “connecting” or “bordering.” The 48 states between Canada and Mexico are contiguous because they are all connected. Alaska and Hawaii are not included.

An inset map is another special element. Inset maps are used to focus in on a small part of a larger map. Some inset maps also show areas that are far away from the main areas on the whole map. The world map in the atlas at the front of this textbook has an inset map.

✓ **SKILLS CHECK:** *The World in Spatial Terms* What special map elements help us understand the information on maps?



FOCUS ON HISTORY

Exploration and Changing Perceptions For centuries, people have used maps to reflect their perceptions of the world around them. For example, early Greeks created maps of the Mediterranean world. They had limited knowledge



INTERPRETING THE VISUAL RECORD

This map of India and the Pacific Ocean dates from 1570. Note the enlarged detail near the bottom of the page. How does this map show that sailors were uncertain about what dangers lay ahead for them? How do the distances and shapes shown on the map compare to those on today's maps?

of what lay beyond that world. Some early European mapmakers even placed sea monsters at the edges of their maps. This reflected their uncertainty about what lay beyond the seas that surrounded the land areas. Early Chinese mapmakers placed China at the center of the world. They believed Chinese culture to be superior to all other cultures.

All of these limited perceptions began to change as sailors explored the outside world. The Chinese explorer Cheng Ho sailed to many places in Southeast Asia and eastern Africa in the 1400s. He took back to China his impressions of the people and places he encountered. About the same time, European explorers began sailing far from home. Soon European explorers sailed around Africa to reach Asia. However, some Europeans believed that a shorter route to Asia lay to the west—across the Atlantic Ocean.

In 1492 Christopher Columbus sailed westward from Spain. He and later explorers found two huge continents—the Americas—that lay between Europe and Asia. Knowledge of the Americas changed European perceptions of the size and features of their world. These changing perceptions drew more Europeans to the Americas and elsewhere. They also sparked a race for European colonies around the world. European countries became more powerful. However, local cultures in the Americas, Africa, and Asia were weakened or destroyed. Even parts of China—once seen by Chinese as the center of the world—fell under the influence of Europe.

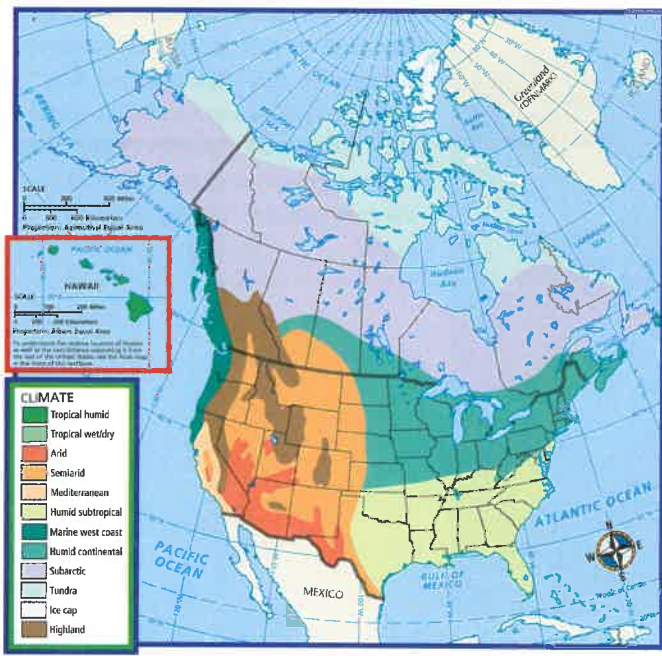
✓ **READING CHECK:** *The Uses of Geography* How did European perceptions of the world change after the voyages of Christopher Columbus? What changes did this bring to societies around the world?



Using Special-Purpose Maps

Geographers use many different kinds of maps. Many maps, for example, focus on certain kinds of information about a place or region. You will find

Climate Map, United States and Canada



Precipitation Map, United States and Canada

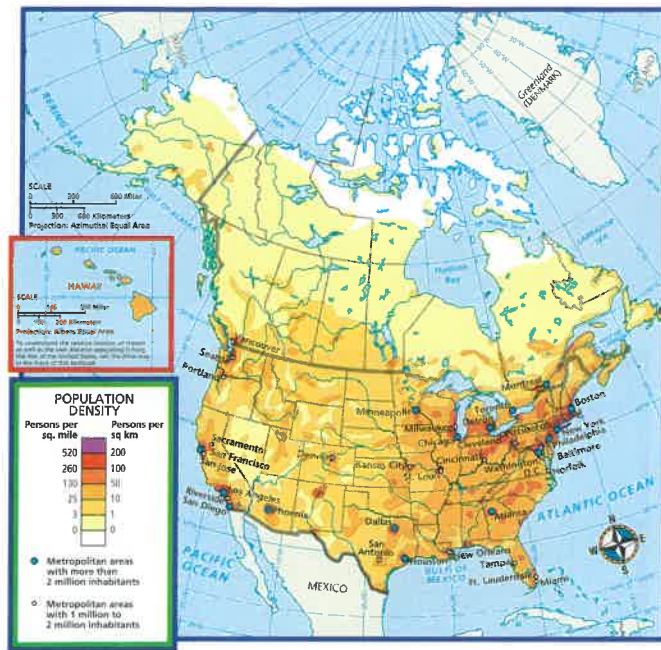


these special-purpose maps throughout this textbook. Some are political and physical atlas maps. You will find such maps at the front of this textbook and at the beginning of units and chapters. Political maps show the world's borders, cities, countries, states, and other political features. Physical maps show natural features like mountains, rivers, and other bodies of water. You will read about these kinds of features in Chapter 4. You will find symbols that identify the features on physical maps in legends. Of course, studying our world means more than looking at country borders, cities, and physical features. Each unit in this textbook opens with other special-purpose maps. These maps show climate, precipitation, population, and economic features.

Climate and Precipitation Maps Mapmakers use some maps to show weather patterns and atmospheric conditions. Climate maps use color to show the various climate regions of the world. You will read about climates in Chapter 3. Colors that identify climate types are found in a legend. However, boundaries between climate regions do not indicate a sudden change in average weather conditions. Instead, those boundaries mark areas of gradual change between climates. **Precipitation** maps are paired with climate maps at the beginning of units. The word *precipitation* refers to condensed droplets of water that fall as rain, snow, sleet, or hail. These kinds of maps show the average amount of precipitation that a region gets each year. Each map's legend uses colors to identify those amounts. By using the map's legend, you can see what areas get the most or least precipitation.

Population and Economic Maps Population maps give you a snapshot of the distribution of people in a region. You will read about population features in Chapter 5. Each color on a population map represents an average number of people living within a square mile or square kilometer. Sometimes symbols identify cities with populations of a certain size. The map's legend identifies these colors and symbols.

Population Map, United States and Canada



Land Use and Resources Map, United States and Canada



By looking at the population map of the United States in Unit 2 you can identify the most populated areas of the country. Those areas are mainly in the eastern half of the country, in the Midwest, and along the West Coast. In general, fewer people live in the interior and western states.

Economic maps show a region's important natural resources and the ways in which land is used. You will read about economic features in Chapter 6. Symbols show the location of resources, such as oil and gold. Colors show where land is used for farming or other economic activities.

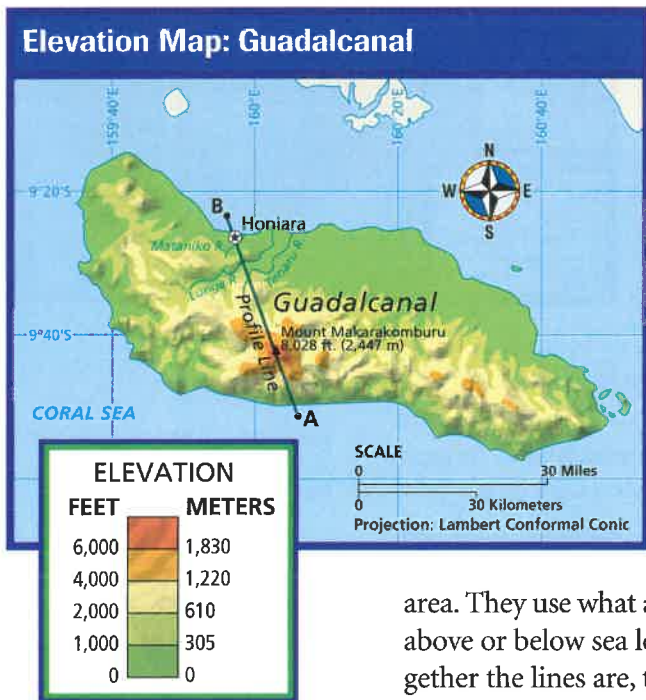
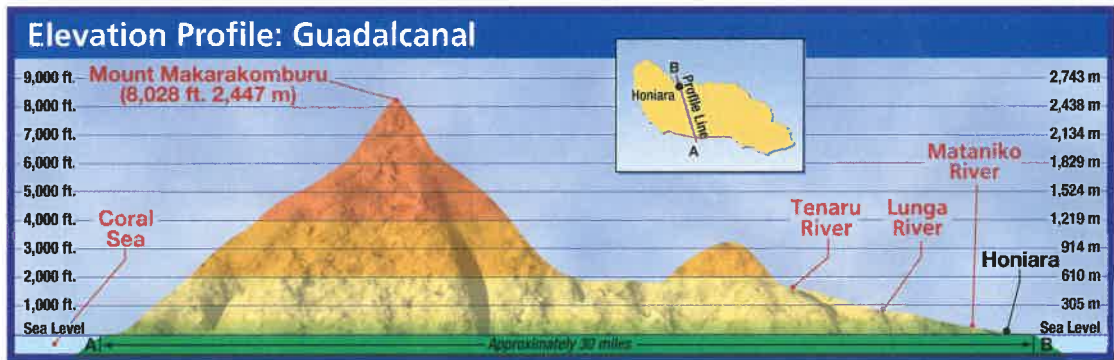
SKILLS CHECK: *The World in Spatial Terms* How are colors used in climate, precipitation, population, and economic maps?

Elevation Profiles and Topographic Maps Some maps focus on an area's land features. You can see that each physical map in this textbook uses color to show land elevations. Elevation is the height of the land above sea level. Each color represents a different elevation.

In each unit atlas, you will also find an elevation profile like the one shown on the next page. An elevation profile shows a side view of a place or area. The profile shows the physical features of Guadalcanal, an island in the South Pacific. These features lie along a line from Point A to Point B in the elevation map below it.

Vertical (bottom to top) and horizontal (left to right) distances are calculated differently on elevation profiles. The vertical distance (such as the height of Mount Makarakomburu) is exaggerated when compared to the horizontal distance between Point A and Point B. This technique is called vertical exaggeration. If the vertical scale were not exaggerated, even tall mountains would appear as small bumps on an elevation profile.

The purpose of some maps is to show just the **topography**—or elevation, layout, and shapes—of the land. A special kind of topographical map is called a contour map. Contour maps provide a way of looking at the shapes of land in an



area. They use what are called contour lines to connect points of equal elevation above or below sea level. Elevation levels are written on the lines. The closer together the lines are, the steeper the land. For example, the land south of Mount Makarakomburu is steeper than the land on the northwestern end of the island.

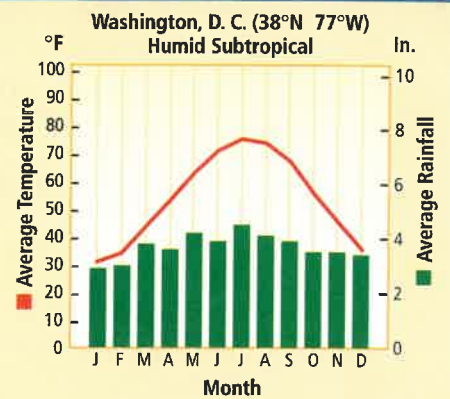
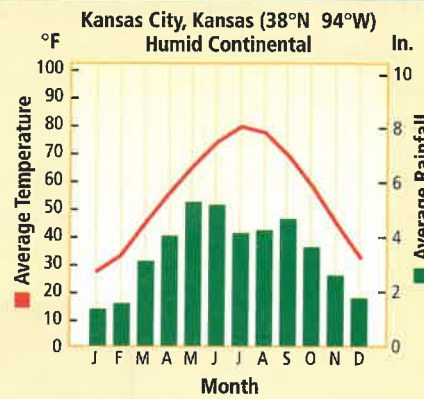
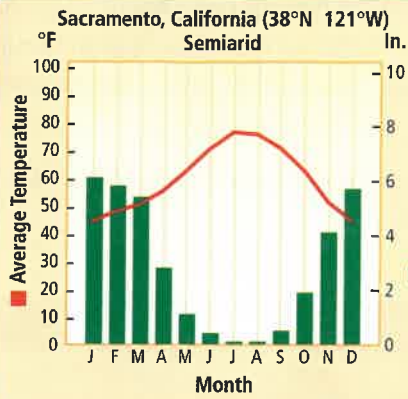
✓ SKILLS CHECK: *The World in Spatial Terms* Where is the largest, lowest, and flattest area of Guadalcanal?

Climate Graphs and Population Pyramids

Maps are not the only special tools geographers use to study the world around us. They also use many tools that you will find useful in economics, government, history, and other social studies. You can read more about bar graphs, charts, pie graphs, and tables in the Social Studies Skill-Building Handbook before Unit 1. In fact, you will find many charts, graphs, and tables in this textbook. You will also find two other common diagrams that show important geographic characteristics: **climate graphs** and **population pyramids**.

A climate graph shows the average temperatures and precipitation in a place. As you can see on the opposite page, along the left side of the climate graph is a range of average monthly temperatures. Along the right side is a range of average monthly precipitation amounts. The months of the year are labeled across the bottom. In this textbook's climate graphs, a red line shows the average monthly temperatures at the location. Green bars show average monthly precipitation amounts.

Climate Graphs



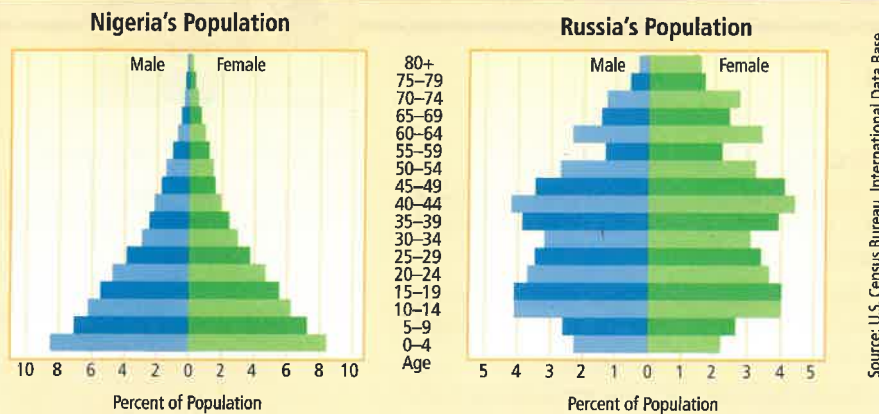
INTERPRETING THE GRAPHS Which city usually gets at least 2 inches of rainfall every month? Which city has the driest summers? Which city has the widest difference between summer and winter temperatures?

A population pyramid shows the percentages of males and females by age group in a country's population. As you can see in the pyramid on this page, these diagrams are split into two sides. Each bar on the left shows the percentage of a country's population that is male and of a certain age. The bars on the right show the same information for females. The percentages are labeled across the bottom of the diagram.

How do you think these population diagrams got their names? The base of a population pyramid shows the percentage of the youngest people in a country. The top shows the percentage of the oldest people. In many countries there are many more younger people than older people. Thus, the base of a country's diagram is often much wider than the top. The result is a diagram shaped like a pyramid.

Population pyramids help us understand population trends in countries. Countries that have large percentages of young people have populations that are growing rapidly. They have pyramids with very wide bases. Nigeria is an example of such a fast-growth country. On the other hand, in countries like

Population Pyramids, 2000



INTERPRETING THE GRAPHS Will Nigeria's population continue to grow rapidly? Why or why not? Which Russian age group is the largest? What does this indicate about Russia's future population growth?

Russia, populations are growing much more slowly or not at all. The percentage of young people may be much smaller there than in fast-growth countries. Population diagrams for those countries actually lose their shapes as pyramids. For this reason, population pyramids are sometimes called age-structure diagrams.

✓ **SKILLS CHECK:** *Human Systems* What do you think a climate graph or population pyramid for your community would look like? Why?

Connecting to HISTORY

Using Historical Maps

Studying geography often requires us to understand how human and physical processes have shaped a place or region over time. Geographers can use historical maps to study these processes and their effects. For example, the map here uses colors to show areas of North and South America that Europeans had settled and taken over before 1700. Students of geography can use this map to predict where various European languages are probably spoken in the Americas today.

Making Generalizations What else might a historical map like this one suggest about the human geography of North and South America today?



Section 2

Review

Define grid, latitude, longitude, equator, parallels, meridians, prime meridian, degrees, hemispheres, continents, atlas, map projections, great-circle route, compass rose, legend, contiguous, precipitation, topography, climate graphs, population pyramids

Working with Sketch Maps Sketch a map of the world. Label Earth's seven continents and the Arctic, Atlantic, Indian, and Pacific Oceans. In the margin, identify at least three bodies of water that are smaller than oceans.

Reading for the Main Idea

- The World in Spatial Terms** What do the letters *N*, *S*, *E*, and *W* mean when they accompany labels for latitude and longitude?
- The World in Spatial Terms** What regional features are found on special maps at the beginning of each unit throughout this textbook?
- Human Systems** Why are population pyramids sometimes called age-structure diagrams?

Critical Thinking

- Evaluating Information** What tools might geographers use to study a region's weather patterns?

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Keyword: SW3 HP1

Organizing What You Know

- Copy the chart below and use it to describe cylindrical, conic, and flat-plane map projections.

Cylindrical	Conic	Flat-plane

Geography for Life

Geographic Information Systems

A geographic information system, or GIS, is a special kind of computer system. A GIS stores, displays, and maps locations and their features. Geographic information systems have become important tools in geography and many other fields. Among those fields are city planning, real estate, and environmental studies. Scientists also use them for a variety of tasks. For example, they can use a GIS to monitor natural hazards like volcanoes. They can also map crop growth and track the movements and locations of endangered species. Emergency workers can use a GIS to learn the shortest route to someone calling 911. Geographic information systems are also helpful in understanding the spread of disease and charting power outages. In short, they are valuable tools for many tasks. Today students can even earn a college degree in GIS technology.

How does a GIS work? The information collected for a map is called spatial data. With a GIS, different sets of this data are saved in a computer as "layers." (See the diagram.) These data layers can then be manipulated, compared, or combined. Cartographers can instantly display this data on a computer screen and get detailed

information about each feature. They can also use a GIS to study features and their locations and to uncover relationships between them.

For example, imagine that you plan to open a restaurant. How would you find the best location for your new business? Using a GIS could help. With a GIS, you could find the locations of vacant buildings. You could then plot those located near major streets. You could also show the buildings' rental costs and information about the people who live nearby. That information might include how much money the people make. With this kind of information, a GIS could help you identify the best locations for your business.

Applying What You Know

- Summarizing** What is a GIS? What are some fields that use GIS technology?
- Problem Solving** What are some geographic problems and issues that could be studied using a geographic information system? What other kinds of spatial data might be useful?

Information Layering



Highways and streets



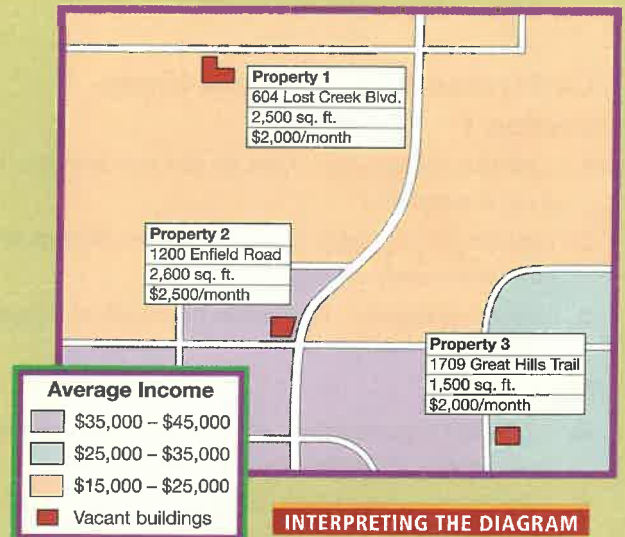
Buildings

- Locations
- Vacancies
- Rental costs
- Square footage



Population

- Zip codes
- Income levels



INTERPRETING THE DIAGRAM

Examine the map above and the layers at the left that would be combined in a GIS. Which of the three locations would you choose for a new restaurant? What influenced your choice?

Review

HOLT

Geography's Impact Video Series

Review the video to answer the closing question: *Why do you think it might be valuable to know the absolute location of a place?*

Building Vocabulary

On a separate sheet of paper, explain the following terms by using them correctly in sentences.

geography	perceptual regions	continents
cartography	equator	atlas
region	parallels	contiguous
formal region	meridians	topography
functional region	prime meridian	population pyramids

Locating Key Places

On a separate sheet of paper, match the letters on the map with their correct labels.

Africa	Europe	Atlantic Ocean
Antarctica	North America	Indian Ocean
Asia	South America	Pacific Ocean
Australia	Arctic Ocean	



Understanding the Main Ideas

Section 1

- The Uses of Geography** What are two main branches in the study of geography?
- The Uses of Geography** What six essential elements help us organize the study of geography?
- Places and Regions** How are the three kinds of regions defined?

Section 2

- The World in Spatial Terms** What are the advantages and disadvantages of the three main map projections?
- The World in Spatial Terms** What are six kinds of special-purpose maps?

Thinking Critically

- Analyzing Information** How are formal, functional, and perceptual regions different from each other?

- Evaluating** How would the six essential elements help you organize the study of your community's geography?
- Identifying Points of View** How might different perspectives affect the way different people perceive the region around your community?

Using the Geographer's Tools

Constructing a Population Pyramid

Use the following percentages to construct a population pyramid for the United States. You can use the pyramids in Section 2 as a model. When you are finished, describe the population features that the diagram shows about the United States. Do you think the U.S. population is growing rapidly or slowly? Which age groups make up the largest parts of the population?

Age Groups	Male	Female
0-4	3.5%	3.3
5-9	3.7	3.5
10-14	3.7	3.5
15-19	3.7	3.5
20-24	3.4	3.3
25-29	3.2	3.3
30-34	3.5	3.6
35-39	4	4.1
40-44	4.1	4.1
45-49	3.5	3.7
50-54	3	3.2
55-59	2.3	2.5
60-64	1.8	2
65-69	1.6	1.9
70-74	1.4	1.8
75-79	1.1	1.6
80+	1.1	2.2

Writing about Geography

Imagine that you are a geography teacher preparing for your first day of class. Prepare a short lecture describing geography and the kinds of things students will learn about during the course of their study. Include ways that students use geography in daily life and how they may use it in a future job. When you have finished your lecture, proofread it to make sure you have used standard grammar, spelling, sentence structure, and punctuation.

SKILL BUILDING



Geography for Life

Creating a Precinct Map

Environment and Society Use your library, the Internet, and other resources to locate information about voting precinct boundaries in your city or county. Then prepare a map showing those precincts and shade the precinct in which you live. Your map should also include notable human and physical features, such as major roads and rivers. In the margin of your map, note how those features may have helped shape precinct boundaries.

Interpreting Maps

Study the map below. Then use the information from the map to help you answer the questions that follow.



- What is the approximate latitude and longitude of The Hague, capital of the Netherlands?
 - 52°S, 8°E
 - 52°N, 4°E
 - 51°N, 1°W
 - 54°N, 4°W
- Imagine that your best friend went to Europe with her parents. Your friend decided to play a location game with you. She sent a postcard with the following message: "We flew in to a

city near 52°N, 4°E. Two days later we went to a place close to 51°N, 4°E for a festival. Finally, we were near 52°N, 0° for three days to visit my mom's cousins." Write a few sentences in which you describe your best friend's trip, naming the cities she and her family visited.

Building Vocabulary

To build your vocabulary skills, answer the following questions.

- Perspective* is an important part of learning about geography.

In which sentence does *perspective* have the same meaning as it does in the sentence above?

 - This particular perspective is the east side of the building.
 - The perspective from the lookout point was beautiful.
 - From the child's perspective, the stranger looked 10 feet tall.
 - Renaissance painters used new techniques to create perspective.
- Contiguous* means the same as
 - bordering.
 - distant.
 - vertical.
 - parallel.

Alternative Assessment

PORTFOLIO ACTIVITY

Learning about Your Local Geography

Individual Project: Researching Climate Statistics

Plan, organize, and complete a research project about climate conditions in your community or a nearby big city. Use the Internet, almanacs, and other resources to find information about average monthly temperatures and precipitation in the location you choose. Then use the data you collect to create a climate graph.

Internet connect

Internet Activity: go.hrw.com

KEYWORD: SW3 GT1

Choose a topic about studying geography:

Use the Internet to research geographic information systems (GIS) and how they can be applied to solve geographic and locational problems. Access the American Fact Finder map-maker and create a map of your state that includes data on population and population density, education, economic and industrial development, and trade. When you create each map, locate your county and answer the questions posed about the data you have collected.

