



# The Basics of Geography

## PHYSICAL AND HUMAN GEOGRAPHY

Chapter 1  
**PHYSICAL GEOGRAPHY**  
Looking at the Earth

## GEOGRAPHY SKILLS HANDBOOK

Chapter 2  
**PHYSICAL GEOGRAPHY**  
A Living Planet

Chapter 3  
**PHYSICAL GEOGRAPHY**  
Climate and Vegetation

Chapter 4  
**HUMAN GEOGRAPHY**  
People and Places

The earth is a unique planet capable of supporting a wide variety of life forms. Human beings adapt and alter the environments on earth.



**PHYSICAL GEOGRAPHY** Internal and external forces constantly change the earth's surface. Here the volcano Arenal, located in Costa Rica, spews molten rock that will cool and alter the land.

## GeoData

**PHYSICAL GEOGRAPHY** The earth is not round but is slightly flattened at the poles.

**PHYSICAL GEOGRAPHY** The total distance from the highest point on earth, Mt. Everest (29,035 ft.), to the lowest point on earth, Mariana Trench (35,840 ft. below sea level), is just over 12 miles.

**HUMAN GEOGRAPHY** The world's population growth in 2009 was an additional 74.6 million people, or about 204,000 people per day.

For more information on physical and human geography . . .



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**RESEARCH WEB LINKS**



**HUMAN GEOGRAPHY** Pictured here is Adnan Nevic, the child officially identified by the United Nations as the six billionth person on earth. He was born on October 12, 1999, in Sarajevo, Bosnia.

# PHYSICAL GEOGRAPHY

## Looking at the Earth

Heat Sensing Scan



### Essential Question

What concepts and tools do geographers use to study the world?



### What You Will Learn

In this chapter you will find some basic concepts essential to the study of geography.

#### SECTION 1

### The Five Themes of Geography

#### SECTION 2

### The Geographer's Tools

GEOGRAPHY SKILLS HANDBOOK

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**TAKING NOTES**

Use the graphic organizer online to record information about the work of geographers and the themes of geography.

Road Map



Satellite Image



Seneca Falls, New York, is represented in a road map, a heat sensing (thermal) scan, and a satellite image.



# The Five Themes of Geography

**A HUMAN PERSPECTIVE** Between 1838 and 1842, Captain Charles Wilkes led an American expedition to the South Pacific and Antarctica. At one stop at a South Sea island, a friendly islander drew a map on the wooden deck planks of the ship. To Wilkes's amazement, the map accurately showed the location of the Tuamotu Archipelago—a chain of about 80 coral islands that stretches more than 1,000 miles across the South Pacific. The islander relied on personal experience sailing in the area and a mental map to accurately show the positions of the islands.

## The Geographer's Perspective

Maps like the one that the islander drew are important tools in geography. The word *geography* comes from the Greek word *geographia*, which means “to describe the earth.” Geographers study the world in a different way than do other social scientists. Historians look at events over time. Geographers, on the other hand, view the world by looking at the use of space on the earth and the interactions that take place there. They look for patterns and connections between people and the land that they live on. **Geography**, then, is the study of the distribution and interaction of physical and human features on the earth.

**METHODS OF GEOGRAPHY** Geographers use a variety of tools to study the use of space on earth. The most common one is a map. Maps are visual representations of a portion of the earth. Maps do not have to be written down to be useful. Since people began roaming the earth, they have created mental maps—maps that they carry in their minds. You use a mental map every day as you go to and from school.

The maps that you are probably most familiar with appear in printed form, such as in road atlases and books. In recent years, more maps have appeared in electronic media such as CD-ROMs and on the Internet.

Geographers also use photographs to gain visual evidence about a place. They organize information into charts, graphs, or tables to learn about geographic patterns and to understand changes over time. They may also construct scale models to make study of the real world easier. Sometimes they use graphic models to illustrate an idea.

Other basic tools used by geographers are the five themes of geography, which also describe patterns and connections in the use of space. These themes organize information about geography into five distinct categories, shown at right. These themes are important to geographic study. They help the geographer to describe the use of space.

### Main Ideas

- Geographers view the world in terms of the use of space.
- Geographers study the world by looking at location, place, region, movement, and human-environment interaction.

### Places & Terms

**geography**  
**absolute location**  
**relative location**  
**hemisphere**  
**equator**  
**prime meridian**  
**latitude**  
**longitude**

### The Five Themes

**Location**

Where is it?

**Place**

What is it like?

**Region**

How are places similar or different?

**Movement**

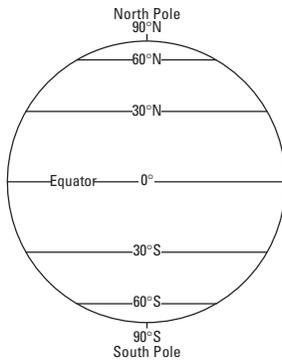
How do people, goods, and ideas move from one location to another?

**Human-Environment Interaction**

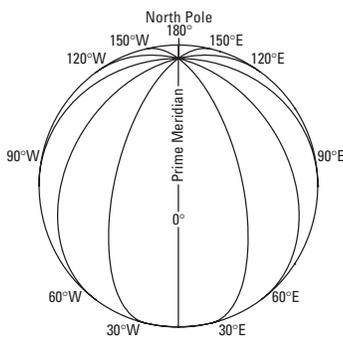
How do people relate to the physical world?

## The Geographic Grid

### Latitude Lines (Parallels)



### Longitude Lines (Meridians)



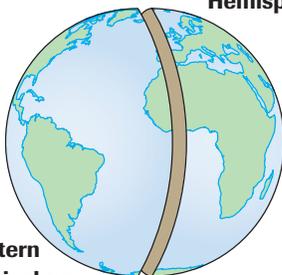
### Northern Hemisphere



### Southern Hemisphere



### Eastern Hemisphere



### Western Hemisphere



### SKILLBUILDER: Interpreting Graphics

- 1 LOCATION** In which two hemispheres is the United States located?
- 2 LOCATION** How many degrees of latitude are there?

## Theme: Location

The geographic question “Where is it?” refers to location. Geographers describe location in two ways. **Absolute location** is the exact place on earth where a geographic feature, such as a city, is found. **Relative location** describes a place in comparison to other places around it.

**ABSOLUTE LOCATION** To describe absolute location, geographers use a grid system of imaginary lines for precisely locating places on the earth’s surface. (See the diagram at left.) Earth is divided into two equal halves. Each half of the globe is called a **hemisphere**. Because the earth is round, a hemisphere can be north and south, or east and west. The **equator** is the imaginary line that divides the north and south halves. The **prime meridian** is the imaginary line dividing the earth east and west. Sometimes this line is called the Greenwich meridian (GREHN•ich muh•RIHD•ee•uhn) line because the line runs through Greenwich, England. ▶

**LATITUDE LINES** To locate places north or south, geographers use a set of imaginary lines that run parallel to the equator. These lines are called **latitude** lines. The equator is designated as the zero-degree line for latitude. Lines north of the equator are called north latitude lines, and lines south of the equator are called south latitude lines.

**LONGITUDE LINES** To complete the grid system, geographers use a set of imaginary lines that go around the earth over the poles. These lines, called **longitude** lines, mark positions in the east and west hemispheres. The prime meridian is the zero-degree line for longitude.

Each site on the earth can have only one absolute location. To find an absolute location using the grid system, you need to find the point where the latitude and longitude lines cross. For example, the absolute location of Melbourne, Australia, is 37° South latitude, 145° East longitude. To see how latitude and longitude lines cross and to learn more about absolute location, see page 17 in the Geography Skills Handbook.

**RELATIVE LOCATION** Relative location describes how a place is related to its surrounding environment. For example, you may tell a person that the library is three blocks west of the park. This helps the person find the library—if he or she knows where the park is located. Using relative location may help you become familiar with the specific characteristics of a place. Learning that Cairo, Egypt, is located near the mouth of the Nile River in Africa, for example, tells you something about Cairo, the Nile River, and even Africa itself.



### Making Comparisons

**A** How is the equator different from the prime meridian?

## Place: Rio de Janeiro, Brazil

Overlooking the entrance to Guanabara Bay, Sugarloaf Mountain is a prominent landform in the skyline of Rio.

Leisure boats rest in the harbor of Botafogo Bay. There is a large commercial shipyard industry in Rio.

Headquarters of corporations and expensive housing compete for space in the scenic part of the city.



## Theme: Place

The question “What is it like?” refers to place. Place includes the physical features and cultural characteristics of a location. All locations on earth have physical features that set them apart, such as climate, landforms, and vegetation. Other features are the product of humans interacting with the environment, such as by building dams, highways, or houses. Still others are the result of humans interacting with animals or with each other. In the photograph above, you can see place features of Rio de Janeiro. Since a location’s culture and its use of space may change over time, the description of a place may also change.

**PLACE** Rio de Janeiro, once the capital of Brazil, lies on the western shore of Guanabara Bay. **How would location on a bay affect the economy of a city?**

## Theme: Region

The question “How are places similar or different?” refers to region. A region is an area of the earth’s surface with similar characteristics. Regions usually have more than one characteristic that unifies them. These may include physical, political, economic, or cultural characteristics. For example, the Sunbelt in the southern United States is a physical region. Geographers categorize regions in three ways: formal, functional, and perceptual regions. 

**FORMAL REGIONS** A formal region is defined by a limited number of related characteristics. For example, the Sahel region of Africa is a desert area characterized by specific climate, vegetation, and land use patterns. In this textbook, the regions you’ll explore generally are defined by continental area and by similar cultural styles. The following are considered formal regions:

- The United States and Canada
- Latin America
- Europe
- Russia and the Republics
- Africa
- Southwest Asia
- South Asia
- East Asia
- Southeast Asia, Oceania, and Antarctica



### Using the Atlas

Refer to the U.S. map on pages A18–A19. What states might be included in the Sunbelt?

**FUNCTIONAL REGIONS** A functional region is organized around a set of interactions and connections between places. Usually a functional region is characterized by a hub, or central place, and links to that central place. For example, a city and its suburbs may form a functional region. Highways, commuter railroads, subways, and bus lines move people from the suburbs to the city for jobs and other activities. Because the city and its suburbs are connected by a great deal of movement back and forth, they form a functional region. ▶

**PERCEPTUAL REGIONS** A perceptual region is a region in which people perceive, or see, the characteristics of the region in the same way. However, the set of characteristics may not be precisely the same for all people. For example, although many people are familiar with the region called the American Midwest, they sometimes differ on how that region is defined. Some people believe the Midwest begins in Ohio. Others believe the region begins in the middle of Illinois.



**Seeing Patterns**

◀ How might areas within a city form a functional region?

## Theme: Human–Environment Interaction

The question “How do people relate to the physical world?” refers to the relationship between humans and their environment. People learn to use what the environment offers them and to change that environment to meet their needs. They also learn to live with aspects of the environment that they cannot control, such as climate.

People living in similar environments do not respond to them in the same way. For example, some people view a hot, sunny climate near a body of water as ideal for recreational activities. Others may see this as an opportunity for raising citrus, olives, or grapes. Human beings work to alter their environments to make them better places or to provide needed goods. People may drain swamps or dig irrigation ditches to grow crops in a particular environment. Sometimes the alterations create new problems, such as pollution. As you study geography, you will learn about many ways humans interact with their environment.

### HUMAN–ENVIRONMENT INTERACTION

Neighbors and friends use sandbags to hold back floodwaters during the Great Mississippi Flood of 1993.

**In what ways do floods alter the landscape?**



## Theme: Movement

The question “How do people, goods, and ideas move from one location to another?” refers to movement. Geographers are interested in the ways people, goods, and ideas move from place to place. Think about the clothing you wear, the music you listen to, or the places you go for entertainment. All of these things involve movement from one place to another. Geographers analyze movement by looking at three types of distance: linear distance, time distance, and psychological distance.

**LINEAR DISTANCE AND TIME DISTANCE** Linear distance simply means how far across the earth a person, an idea, or a product travels. Physical geography can affect linear distance by forcing a shift in a route to avoid impassable land or water.

Time distance is the amount of time it takes for a person, an idea, or a product to travel. Modern inventions have shortened time distances. For example, in the 1800s, pioneers traveled up to six months to reach California. Today you can get there by airplane from almost any U.S. location in under six hours. With the use of the Internet, ideas can travel around the world in seconds. ◀

**PSYCHOLOGICAL DISTANCE** Psychological distance refers to the way people view distance. When you were younger, some locations seemed very far away. As you grew older, the distance to these locations probably seemed to shrink. Studies show that, as we become familiar with a place, we think it is closer than it actually is. Less familiar places seem to be further away. Psychological distance may influence decisions about many different human activities.

Across the world, people make important choices based on linear distance, time distance, and psychological distance. These choices make up patterns that geographers can study. In the next section, you’ll read about the tools they use to study these patterns.



### Seeing Patterns

▶ How do interstate highways affect linear distance and time distance?



## Assessment

### 1 Places & Terms

Explain the meaning of each of the following terms.

- geography
- hemisphere
- equator
- prime meridian
- latitude
- longitude

### 2 Taking Notes

**REGION** Review the notes you took for this section.

5 Themes:

- What is a region?
- What are three types of regions?

### 3 Main Ideas

- a. What are the five themes of geography?
- b. How is place different from location?
- c. Why do geographers study human-environment interaction?

### 4 Geographic Thinking

#### Making Generalizations

How is the study of geography different from the study of history? **Think about:**

- use of space on earth
- relationships between people and the environment

See Skillbuilder Handbook, page R6.



**EXPLORING LOCAL GEOGRAPHY** Using the five themes of geography, develop a **brochure** describing your community. Use pictures or sketches, maps, and other data to complete your descriptions.



# The Geographer's Tools

## Main Ideas

- Geographers use two- and three-dimensional tools to learn about the earth.
- Geographers use computer-assisted technology to study the use of the earth's surface.

## Places & Terms

**globe**

**map**

**cartographer**

**map projection**

**topographic map**

**Landsat**

**Geographic Information Systems (GIS)**

**A HUMAN PERSPECTIVE** At noon on a sunny midsummer day, sometime around 255 B.C., Eratosthenes drove a stake into the ground at the mouth of the Nile River in Alexandria, Egypt. He then noted the angle of the shadow cast by the stake. Meanwhile at Syene (modern-day Aswan, Egypt), another person drove a stake into the ground—but it cast no shadow. Using the angle of the first shadow and the distance between Syene and Alexandria, Eratosthenes calculated the circumference of the earth. By today's measurements, he was off by about 15 percent, but he was remarkably accurate considering the simple tools he used. Eratosthenes was one of the earliest geographers to use tools and critical thinking to measure and describe the earth.

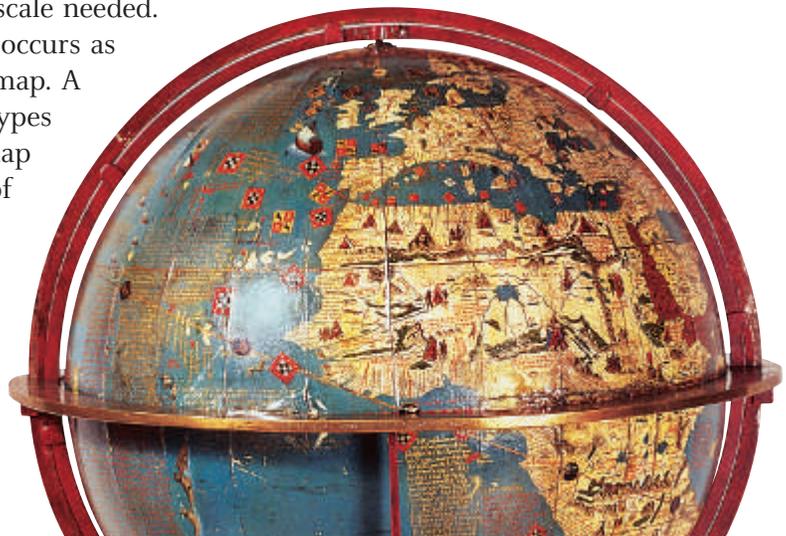
## Maps and Globes

A geographer's tools include maps, globes, and data that can be displayed in a variety of ways. The oldest known map is a Babylonian clay tablet created about 2,500 years ago. The tablet is about four inches high and shows the Babylonian world surrounded by water. Over the centuries, mapmaking evolved into a very complex task. However, a map's function has remained the same—to show locations of places, landforms, and bodies of water, and where they are in relation to other parts of the earth.

**TWO OR THREE DIMENSIONS** A **globe** is a three-dimensional representation of the earth. It provides a way to view the earth as it travels through space. But since the earth is a sphere, we can see only one half of it at any time. For certain tasks, globes are not very practical because they are not easily portable.

People often prefer to use **maps**, which are two-dimensional graphic representations of selected parts of the earth's surface. Maps are easily portable and can be drawn to any scale needed. The disadvantage of a map is that distortion occurs as the earth's surface is flattened to create the map. A **cartographer**, or mapmaker, reduces some types of distortion by using different types of map projections. A **map projection** is a way of drawing the earth's surface that reduces distortion caused by presenting a round earth on flat paper. To learn more about map projections, see the Geography Skills Handbook, pages 18–19.

This globe, created circa 1492, is turned to show Africa and Europe.



**BACKGROUND**

Navigational maps, often referred to as charts, help their users to plot a course through air or water.

**TYPES OF MAPS** The three types of maps are general reference maps, thematic maps, and navigational maps. One kind of general reference map is called a **topographic map**, which is a representation of natural and man-made features on the earth. Thematic maps emphasize specific kinds of information, such as climate or population density. Sailors and pilots use the third type of map—navigation maps. You can learn more about using different maps in the Geography Skills Handbook, pages 20–23.

## The Science of Mapmaking

A cartographer decides what type of map to create by considering how the map will be used. Keeping that purpose in mind, he or she then determines how much detail to show and what size the map should be.

**SURVEYING** The first step in making a map is to complete a field survey. Surveyors observe, measure, and record what they see in a specific area. Today, most mapping is done by remote sensing, the gathering of geographic information from a distance by an instrument that is not physically in contact with the mapping site. These data are gathered primarily by aerial photography or by satellites.

The data gathered includes information such as elevation, differences in land cover, and variations in temperature. This information is recorded and converted to a gray image. Cartographers then use these data and computer software to construct maps. See the illustration below to learn more about satellite surveying.

### How Satellites Gather Map Data

[hmhsocialstudies.com](http://hmhsocialstudies.com) **INTERACTIVE**

**1** As the satellite orbits the earth, a scanner constantly records data from the earth's surface.

**2** Instruments measure invisible electromagnetic waves emitted by each object on earth. Because these waves are unique for every object, computers can analyze and identify them.

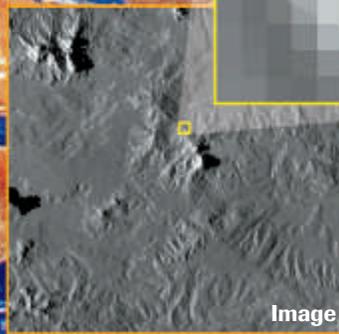
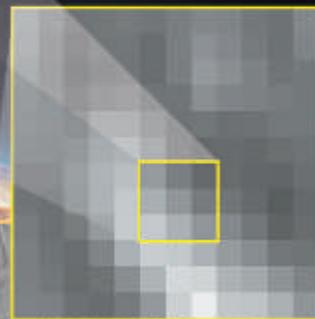
**3** The data collected is converted first to code and then to pixels—electronic dots. Computer software then converts the pixels into usable images.

The first step in mapmaking is collecting data. Remote sensors gather information for constructing maps.



Code		
97	128	151
64	97	133
46	78	102

Pixels



Image

**SATELLITES** Today, geographers rely heavily on satellites to provide geographic data. Two of the best-known satellites are Landsat and GOES. **Landsat** is actually a series of satellites that orbit more than 100 miles above Earth. Each time a satellite makes an orbit, it picks up data in an area 115 miles wide. Landsat can scan the entire Earth in 16 days.

Geostationary Operational Environmental Satellites (GOES) is a weather satellite system. The satellites fly in orbit in synch with Earth's rotation. By doing so, they always view the same area. They gather images of atmospheric conditions that are useful in forecasting the weather.

## Geographic Information Systems



**Geographic Information Systems (GIS) allow geographers to solve problems by combining geographic information about a location from several sources.**

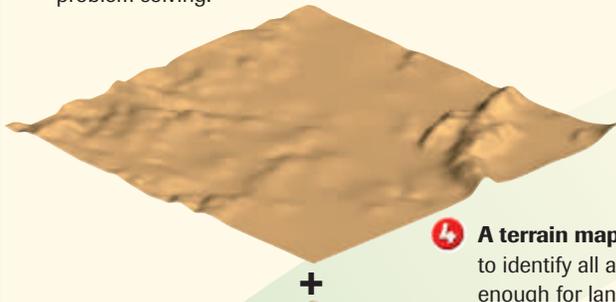


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90	91	92	93	94	95	96	97	78	89	90	91	92	93	94	95	96	67
91	92	93	94	95	96	97	98	79	90	91	92	93	94	95	96	97	68
92	93	94	95	96	97	98	99	80	91	92	93	94	95	96	97	98	69
93	94	95	96	97	98	99	00	81	92	93	94	95	96	97	98	99	70

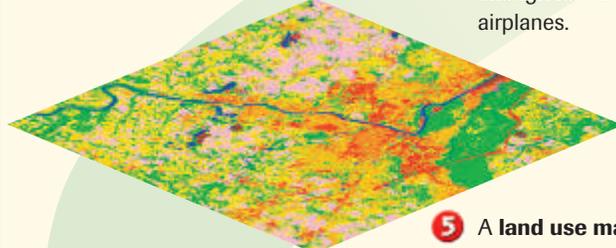
**1** A question or problem is posed. An example is, "In what general area near this town might an airport be located?" A section of land is identified for problem solving.

**2** Computer databases hold geographic information about the location.

**3** The user selects layers of information that answer the question "What geographic characteristics are important for a good airport site?"



**4** A **terrain map** is selected to identify all areas flat enough for landing airplanes.



**5** A **land use map** shows areas that have few homes.



**6** The **base map** shows where roads are located so that the airport can be reached and safety concerns are handled.



**7** The layers of information are combined to create a **composite map** showing possible sites for the airport.

**GEOGRAPHIC INFORMATION SYSTEMS** The newest tool in the geographer’s toolbox is **Geographic Information Systems (GIS)**. GIS stores information about the world in a digital database. GIS has the ability to combine information from a variety of sources and display it in ways that allow the user to visualize the use of space in different ways.

When using the system, geographers must look at a problem and decide what types of geographic information would help them solve the problem. The information could include maps, aerial photographs, satellite images, or other data. Next, they select the appropriate layers of information. Then, GIS creates a composite map combining the information. Study the diagram on page 12 to learn more about the way GIS works.

**GLOBAL POSITIONING SYSTEM (GPS)** A familiar tool of geographers is GPS or Global Positioning System. It was originally developed to help military forces know exactly where they were on the earth’s surface. The system uses a series of 24 satellites called Navstars, which beam information to the earth. The exact position—latitude, longitude, altitude, and time—is displayed on a hand-held receiver. Hikers, explorers, sailors, and drivers use GPS devices to determine location. They are also used to track animals. **A**

Geographers use a variety of other tools including photographs, cross sections, models, cartograms, and population pyramids. These tools help geographers to visualize and display information for analysis. They are looking for patterns and connections in the data they find. You will learn how to use these tools in the Geography Skills Handbook, which follows, and in the Map and Graph Skills pages in this book.



**MOVEMENT** Scientists use a GPS device to track this bear in Minnesota.

**What other uses could be found for a GPS device?**



**Making Comparisons**

**A** How might the military use both GOES and GPS?



**Assessment**

**1 Places & Terms**

Explain the meaning of each of the following terms.

- globe
- map
- cartographer
- map projection
- topographic map
- GIS

**2 Taking Notes**

**REGION** Review the notes you took for this section.

<i>Tools:</i>

- How would a globe show a region differently than a map?
- How does GIS aid in understanding a region?

**3 Main Ideas**

- a. What are the three basic types of maps?
- b. What are some geographers’ tools in addition to maps and globes?
- c. How does a cartographer decide which type of map is needed?

**4 Geographic Thinking**

**Making Generalizations** How does modern technology help geographers? **Think about:**

- digital information
- satellite images

**S** See Skillbuilder Handbook, page R6.

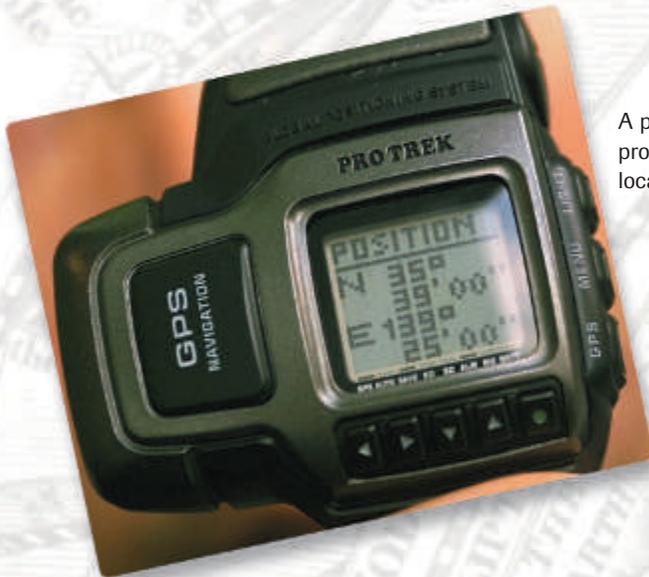


**MAKING COMPARISONS** Choose a place on the earth and in an atlas, and find three maps that show the place in three different ways. Create a **chart** that lists the similarities and differences in the way the place is shown on the three maps.

This handbook covers the basic map skills and information that geographers rely on as they investigate the world—and the skills you will need as you study geography.

## Finding Location

Mapmaking depends on surveying the earth's surface. Until recently, that activity could only happen on land or sea. Today, aerial photography and satellite imaging are the most popular ways to gather data.



A personal **GPS** device provides the absolute location to the user.

**Magnetic compasses** introduced by the Chinese around the 1100s helped to accurately determine direction.



Nigerian surveyors use a **theodolite**, a type of surveying instrument. It precisely measures angles and distances on the earth.



## Economic Activities of Southwest Asia

Activities	
	Commercial farming
	Commercial fishing
	Forestry
	Nomadic herding
	Subsistence farming
	Little or no economic activity
Resources	
	Chromium
	Coal
	Copper
	Hydroelectric power
	Iron ore
	Lead
	Natural gas
	Petroleum
	Phosphate



## Reading a Map

Most maps have these elements, which are necessary to read and understand them.

- TITLE** The title explains the subject of the map and gives you an idea of what information the map conveys.
- COMPASS ROSE** The compass rose shows you the north (N), south (S), east (E), and west (W) directions on the map. Sometimes only north is indicated.
- LABELS** Labels are words or phrases that explain features on the map.
- LEGEND** A legend or key lists and explains the symbols and use of color on the map.
- LINES OF LATITUDE** These are imaginary lines that measure distance north or south of the equator.
- LINES OF LONGITUDE** These are imaginary lines that measure distance east or west of the prime meridian.
- SCALE** A scale shows the ratio between a unit of length on the map and a unit of distance on the earth.
- SYMBOLS** Symbols represent such items as capital cities, economic activities, or natural resources. Check the map legend for more details.
- COLORS** Colors represent a variety of information on a map. The map legend indicates what the colors mean.

## Scale

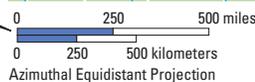
A geographer decides what scale to use by determining how much detail to show. If many details are needed, a large scale is used. If fewer details are needed, a small scale is used.

### Ratio Scale

This shows the ratio of distance on the map compared to real earth measurement. Here, 1 inch on the map equals 30,000,000 inches (500 miles) in actual distance on the earth.

### EASTERN UNITED STATES

Scale: 1:30,000,000  
1"= 500 miles



### Bar Scale

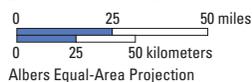
This bar shows the ratio of distance on the map to distance on the earth. Here, 1 inch equals 500 miles.

### Small Scale

A small scale map shows a large area but without much detail. A small scale is used to see relative location in a region or between regions.

### WASHINGTON, D.C., METRO AREA

Scale: 1:3,000,000  
1"= 50 miles

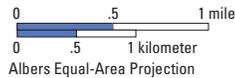
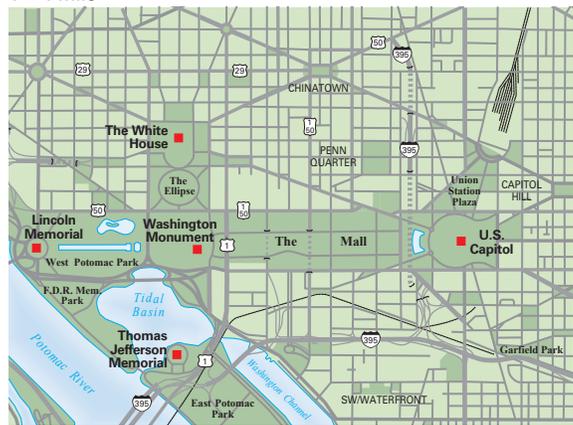


### Large Scale

A large scale map shows a small area with much more detail. A large scale is used to see relative location within a region.

### WASHINGTON, D.C.

Scale: 1:62,500  
1"= 1 mile



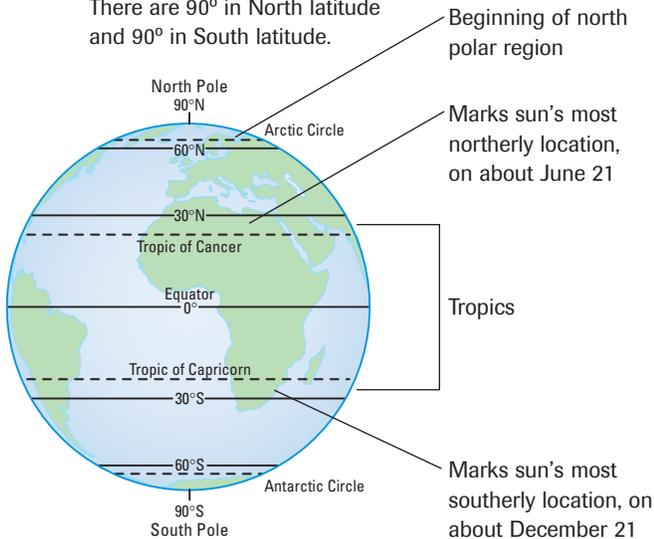
## Using the Geographic Grid

As you learned in Chapter 1, geographers use a grid system to identify absolute location. The grid system uses two kinds of imaginary lines:

- latitude lines, also called parallels because they run parallel to the equator
- longitude lines, also called meridians because, like the prime meridian, they run from pole to pole

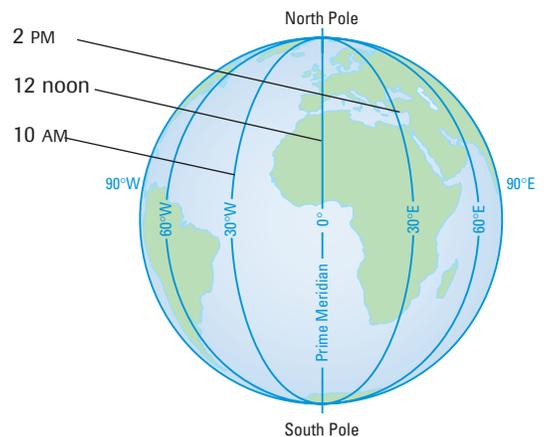
### Latitude

There are 90° in North latitude and 90° in South latitude.



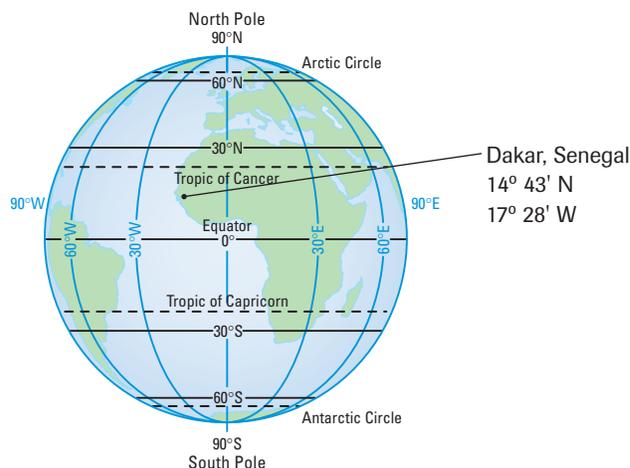
### Longitude

There are 180° in West longitude and 180° in East longitude. Lines also mark the hours of the day as the earth rotates. Every 15° east or west is equal to one hour.



### Global Grid

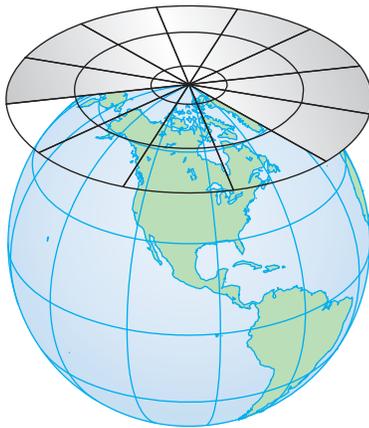
Absolute location can be determined by noting where latitude and longitude lines cross. For more precision, each degree is divided into 60 minutes.



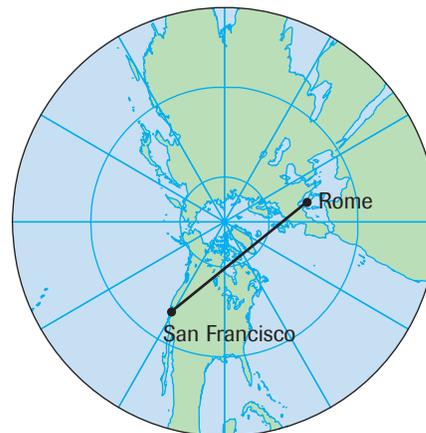
## Projections

A projection is a way of showing the curved surface of the earth on a flat map. Because the earth is a sphere, a flat map will distort some aspect of the earth's surface. Distance, shape, direction, or area may be distorted by a projection. Be sure to check the projection of a map so you are aware of how the areas are distorted.

### PLANAR PROJECTIONS

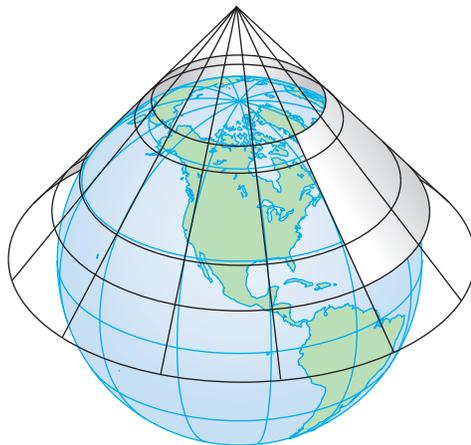


A planar projection is a projection on a flat surface. This projection is also called an azimuthal projection. It distorts size and shape. To the right is a type of planar projection.



The **azimuthal** projection shows the earth so that a line from the central point to any other point on the map gives the shortest distance between the two points. Size and shape are distorted.

### CONICAL PROJECTIONS

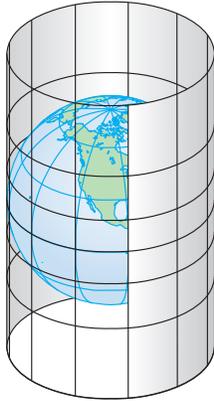


A conical projection is a projection onto a cone. This projection shows shape fairly accurately, but it distorts landmasses at the edges of the map.



Conical projections are often used to show landmasses that extend over large areas going east and west.

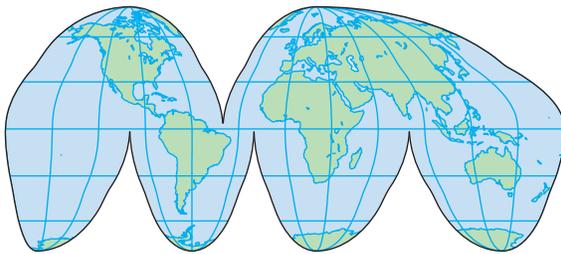
## COMPROMISE PROJECTIONS



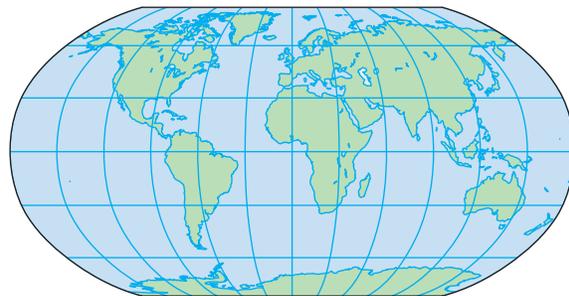
A compromise projection is a projection onto a cylinder. This projection shows the entire earth on one map. Included here are three types of compromise projections.



In the compromise projection called **Mercator**, the shapes of the continents are distorted at the poles and somewhat compressed near the equator. For example, the island of Greenland is actually one-eighth the size of South America.



The compromise projection called **homolosine** is sometimes called an "interrupted map," because the oceans are divided. This projection shows the accurate shapes and sizes of the landmasses, but distances on the map are not correct.



A **Robinson** projection is a type of compromise projection, commonly used in textbooks. It shows the entire earth with nearly the true sizes and shapes of the continents and oceans. However, the shapes of the landforms near the poles appear flat.



### Map Practice

Use pages 14–19 to help you answer these questions. Look at the map on page 15 to answer questions 1–3.

1. How are colors used on this map?
2. Is the map a large-scale or a small-scale map? How do you know?
3. What is the approximate longitude of Buenos Aires?
4. What are the names of three lines of latitude besides the equator?
5. Which projections show shape of landmasses most accurately?

**GeoActivity**

**MAKING COMPARISONS** Look at the maps in the atlas in this book. Create a **database** that shows the projection and scale of each map. Write a summary of your findings.

## Using Different Types of Maps

**PHYSICAL MAPS** Physical maps help you see the types of landforms and bodies of water found in a specific area. By studying the map, you can begin to understand the relative location and characteristics of a place or region.

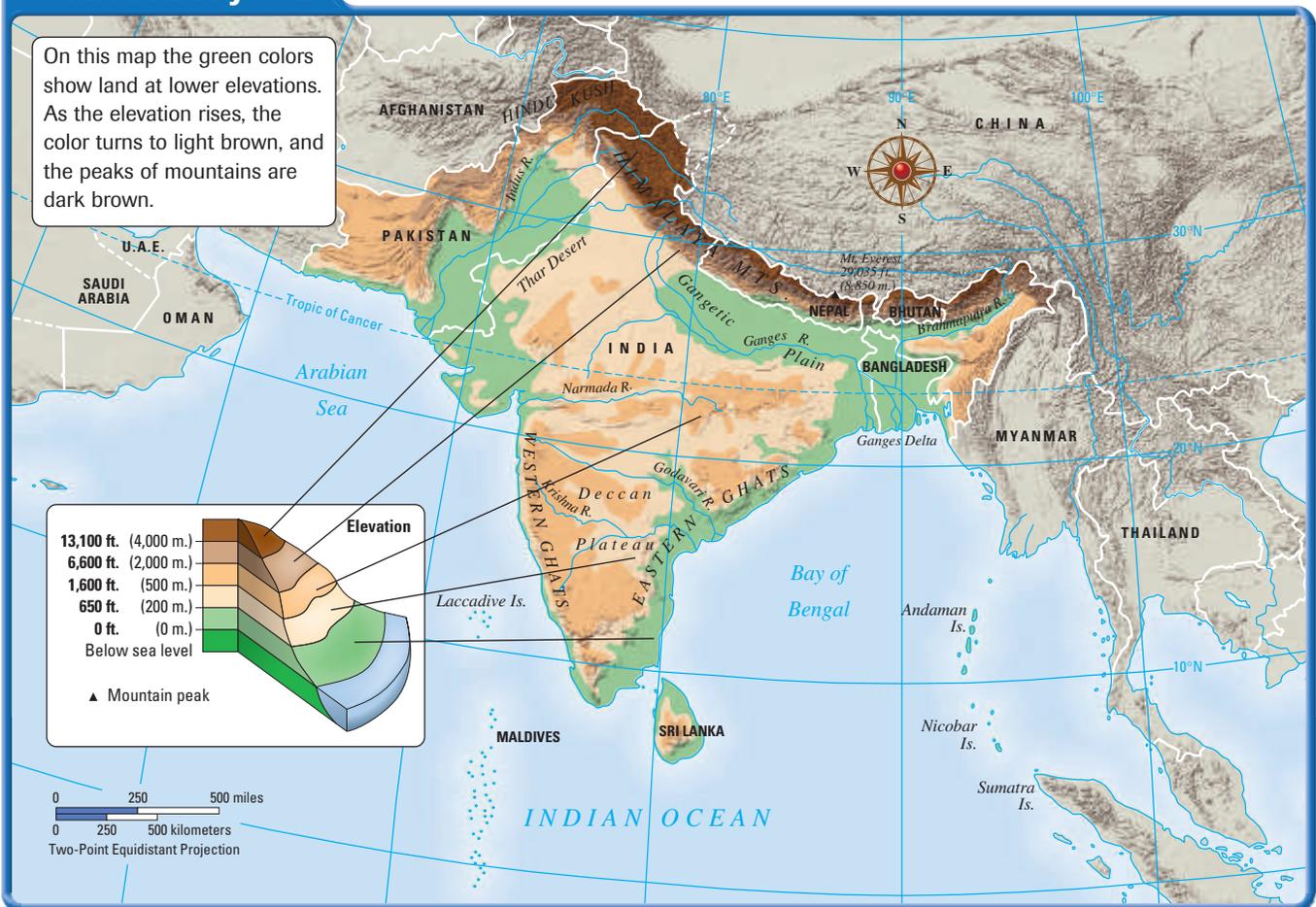
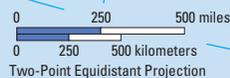
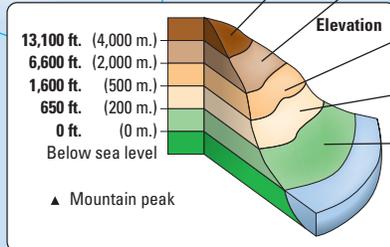
On a physical map, color, shading, or contour lines are used to indicate elevation or altitude, also called relief.

Ask these questions about the physical features shown on a map:

- Where on the earth's surface is this area located?
- What is its relative location?
- What is the shape of the region?
- In which direction do the rivers flow? How might the direction of flow affect travel and transportation in the region?
- Are there mountains or deserts? How do they affect the people living in the area?

### South Asia: Physical

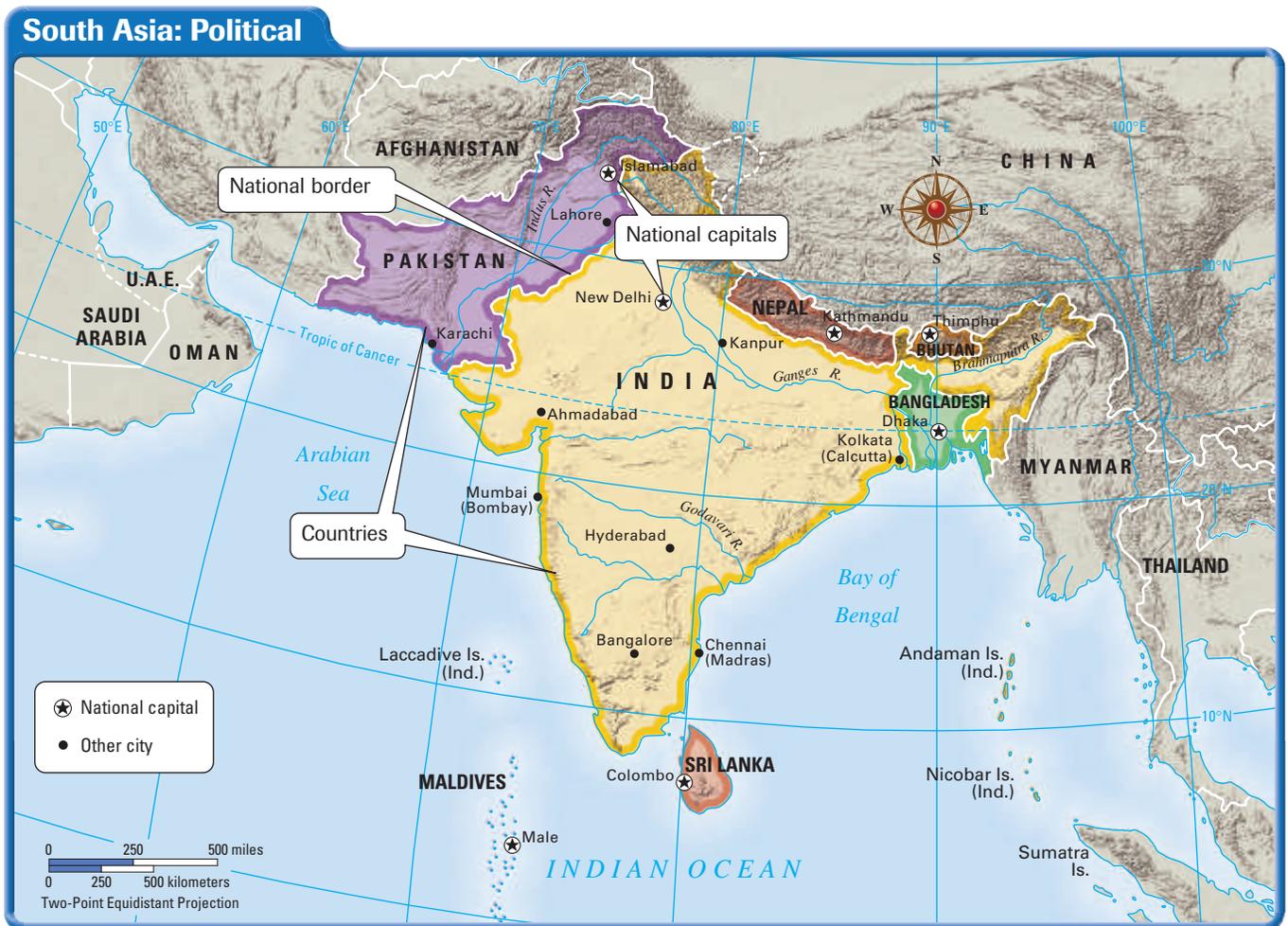
On this map the green colors show land at lower elevations. As the elevation rises, the color turns to light brown, and the peaks of mountains are dark brown.



**POLITICAL MAPS** Political maps show features on the earth's surface that humans created. Included on a political map may be cities, states, provinces, territories, or countries.

Ask these questions about the political features shown on a map:

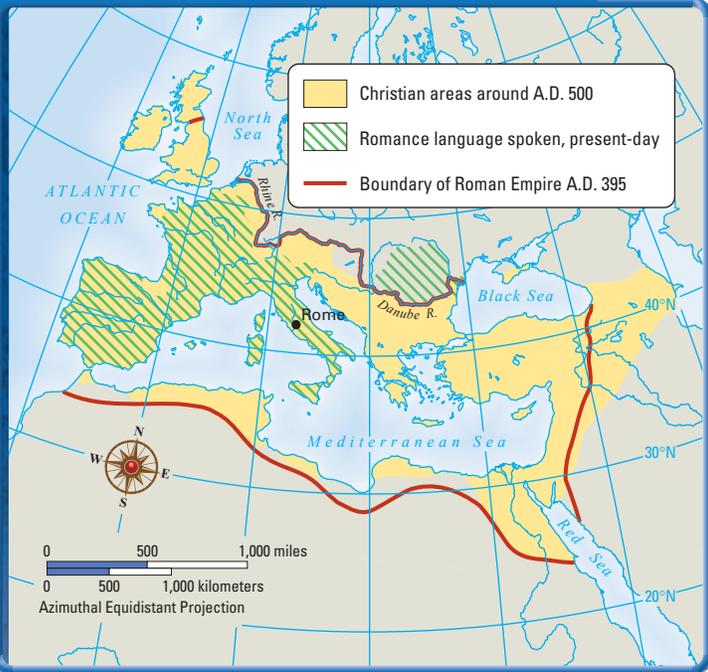
- Where on the earth's surface is this area located?
- What is its relative location? How might the location affect the economy or foreign policy of a place?
- What is the shape and size of the country? How might shape or size affect the people living in the country?
- Who are the neighbors in the region, country, state, or city?
- How populated does the area seem to be? How might that affect activities there?



## Thematic Maps

Geographers also rely on thematic maps, which focus on specific types of information. For example, in this textbook you will see thematic maps that show climate, vegetation, natural resources, population density, and economic activities. Some thematic maps illustrate historical trends, and others may focus on the movement of people or ideas. These maps may be presented in a variety of ways.

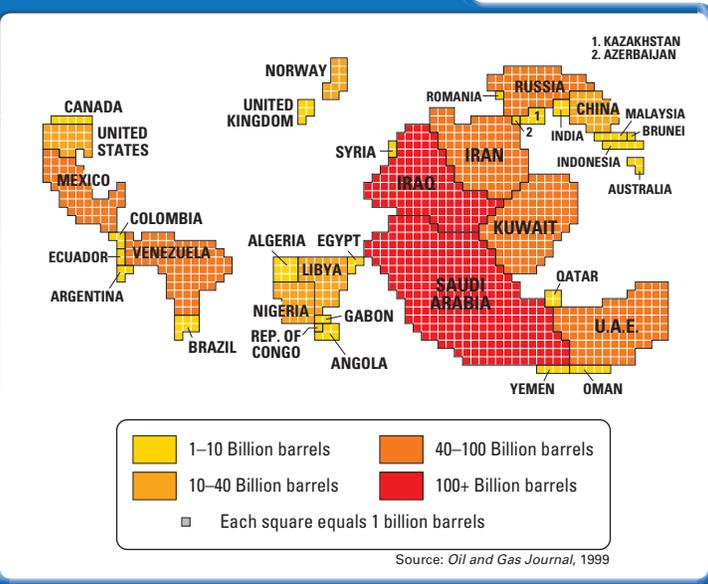
### Cultural Legacy of the Roman Empire



**QUALITATIVE MAPS** Qualitative maps use colors, symbols, dots, or lines to help you see patterns related to a specific idea. The map shown to the left shows the influence of the Roman Empire on Europe, North Africa, and Southwest Asia. Use the suggestions below to help you interpret a map.

- Check the title to identify the theme and data being presented.
- Study the legend to understand the theme and the information presented.
- Look at physical or political features of the area. How might the theme of the map affect them?
- What are the relationships among the data?

### Estimated World Oil Reserves



**CARTOGRAMS** In a cartogram, geographers present information about a country based on a set of data other than land area. The size of each country is drawn in proportion to that data rather than to its land size. On the cartogram shown to the left, the countries are represented on the basis of their oil reserves. Use the suggestions below to help you interpret a cartogram.

- Check the title and legend to identify the data being presented.
- What do sizes represent?
- Look at the relative sizes of the countries shown. Which is largest? smallest?
- How do the sizes of the countries on the physical map differ from those in the cartogram?
- What are the relationships among the data?

**FLOW-LINE MAPS** Flow-line maps illustrate movement of people, goods, ideas, animals, or even glaciers. The information is usually shown in a series of arrows. Location, direction, and scope of movement can be seen. The width of the arrow may show how extensive the flow is. Often the information is given over a period of time. The map shown to the right portrays the movement of the Bantu peoples in Africa. Use the suggestions below to help you interpret a flow-line map.

- Check the title and legend to identify the data being presented.
- Over what period of time did the movement occur?
- In what direction did the movement occur?
- How extensive was the movement?

Remember that the purpose of a map is to show a location and provide additional information. Be sure to look at the type of map, scale, and projection. Knowing how maps present the information will help you interpret the map and the ideas it presents.

### Bantu Migrations



### Map Practice

Use pages 20–23 to help you answer these questions. Use the maps on pages 20–21 to answer questions 1–3.

1. In what direction does the Ganges River flow?
2. China is the northern neighbor of which countries?
3. Which city is closer to the Thar Desert—Lahore, Pakistan or New Delhi, India?
4. Why are so few nations shown on the cartogram?
5. Which of the thematic maps would best show the location of climate zones?

### GeoActivity

**EXPLORING LOCAL GEOGRAPHY** Obtain a physical–political map of your state. Use the data on it to create two separate **maps**. One should show physical features only, and one should show political features only.

**VISUAL SUMMARY**  
LOOKING AT THE EARTH

**The Five Themes of Geography**

**Location**

- **Absolute Location** uses latitude and longitude.
- **Relative Location** uses relationships to other places.

**Place** This explains the characteristics of an area.

**Region** This looks at a larger area with similar characteristics.

**Movement** People, plants, animals, and ideas move through time and across space.

**Human–Environment Interaction**

Humans interact with the environment to adjust to it or to alter it.



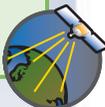
**The Geographer's Tools**

**Globe** A three-dimensional representation of the earth

**Map** A two-dimensional representation of the earth

**Mapmaking**

- Area is surveyed.
- High-tech tools, including satellites, are used to gather data and create maps.



**Geography Skills Handbook**

**Map Elements** Maps have elements such as a legend to aid in interpreting them.

**Scale** This determines how much detail is shown on a map.

**Grid** Gridlines help to determine absolute location.

**Projection** This shows the earth's surface in two dimensions but distorts either size, shape, direction, or area.

**Types of Maps** These include physical, political, and thematic, such as qualitative, cartographic, or flow-line.



**Reviewing Places & Terms**

**A. Briefly explain the importance of each of the following.**

- |                   |                    |
|-------------------|--------------------|
| 1. geography      | 6. longitude       |
| 2. hemisphere     | 7. globe           |
| 3. equator        | 8. map             |
| 4. prime meridian | 9. cartographer    |
| 5. latitude       | 10. map projection |

**B. Answer the questions about vocabulary in complete sentences.**

- Which of the above terms indicate imaginary parallel lines that circle the earth?
- Which term marks the beginning of longitude?
- Which of the above terms has 180° in each hemisphere?
- How may hemispheres be divided?
- What imaginary line separates the Northern Hemisphere from the Southern Hemisphere?
- Which term is also known as a meridian line?
- Would a cartographer work on a map or a globe?
- Why are map projections needed?
- Which of the above terms are associated with the geographic grid?
- Which term characterizes the study of the use of land space?

**Main Ideas**

**The Five Themes of Geography (pp. 5–9)**

- How is absolute location different from relative location?
- What are some examples of information that would be included in a place description?
- How is place different from region?
- Why do geographers study movement?

**The Geographer's Tools (pp. 10–13)**

- What is the purpose of a map?
- How do satellites aid in mapmaking?
- Why is GIS a valuable tool for examining the geography of a place?

**Geography Skills Handbook (pp. 14–23)**

- How is the use of small-scale maps different from the use of large-scale maps?
- In what ways may relief be shown on a map?
- What are three types of thematic maps?

## Critical Thinking

### 1. Using Your Notes

Use your completed chart to answer these questions.

5 Themes:
Tools:

- How are relative location and place related?
- How do thematic maps help geographers understand the five themes?

### 2. Geographic Themes

- REGION** Write a sentence describing a region that your community is a part of. Be sure to identify the region and give reasons for your answer.
- MOVEMENT** How are linear and time distances related to the theme of movement?

### 3. Identifying Themes

Into which two hemispheres would an island at  $50^{\circ}\text{S}$ ,  $60^{\circ}\text{W}$  be placed? Which of the five themes are reflected in your answer?

### 4. Drawing Conclusions

Why was it necessary for geographers to develop a grid system?

### 5. Seeing Patterns

Into which formal region, functional region, and perceptual region might your community be placed?

For Additional Test Practice



[hmsocialstudies.com](http://hmsocialstudies.com)

TEST PRACTICE

## Geographic Skills: Interpreting Maps

### Continents of the World

Use the map to answer the following questions.

- LOCATION** What is the absolute location of the continent of Australia?
- LOCATION** What is the relative location of South America?
- PLACE** What body of water is located at  $45^{\circ}\text{N}$ ,  $45^{\circ}\text{W}$ ?



### GeoActivity

With a partner, choose and record the latitude and longitude of five locations on the map at left. Then trade your list with another set of partners. Have them search for the coordinates on your list, and do the same with their list. Then check the accuracy of the findings.

[hmsocialstudies.com](http://hmsocialstudies.com)

### MULTIMEDIA ACTIVITY

Use the links at [hmsocialstudies.com](http://hmsocialstudies.com) to do research about GIS. Take notes on the ways GIS can be used to provide geographic information for mapmaking, site selection, and simulating environmental effects.

**Creating a Multimedia Presentation** Using the information you gathered about GIS, create a multimedia presentation explaining the various aspects of GIS and how it helps geographers and others solve problems.

