

## Why It Matters

News coverage of local, national, and international events is part of daily life in the twenty-first century. An understanding of geography will help you learn how such events affect your life.

## Big Ideas

### Section 1: Geography Skills Handbook

**Geography is used to interpret the past, understand the present, and plan for the future.** Geography skills provide the tools for understanding relationships between people, places, and environments.

### Section 2: The Geographer's Craft

**Geographers study how people, places, and environments are distributed on Earth's surface.** Geographers use six essential elements to organize and describe information about the Earth. Geographers study patterns of human and physical geography using direct observation, mapping, interviewing, statistics, and technology.

## Geography ONLINE

**Chapter Overview** Visit the *World Geography and Cultures Web* site at [glencoe.com](http://glencoe.com) and click on Chapter Overviews—Chapter 1 to preview information about how geographers look at the world.

# How Geographers Look at the World

The Anasazi ruins at Mesa Verde, Colorado, offer a fascinating glimpse of early Native American cultures.

**FOLDABLES™**  
Study Organizer

**Organizing Information** Make a Top-Tab Book to help you understand how geographers look at the world.

Elements of Geography	Research Methods	Geography and Other Subjects	Geography as a Career
How Geographers Look at the World			

**Reading and Writing** As you read the chapter, write at least five facts, generalizations, or observations for each of the following headings: Elements of Geography, Research Methods, Geography and Other Subjects, and Geography as a Career.



SECTION I

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# Geography Skills Handbook

**Geography skills** provide the tools and methods for us to understand the relationships between people, places, and environments. We use geographic skills when we make daily personal decisions—where to buy a home; where to get a job; how to get to the shopping mall; where to go on vacation. Community decisions, such as where to locate a new school or how to solve problems of air and water pollution, also require the skillful use of geographic information.

*Geographers use a wide array of tools and technologies—from basic globes to high-tech global positioning systems—to understand the Earth. These help us collect and analyze a great deal of information. However, the study of geography is more than knowing a lot of facts about places. Rather, it has more to do with asking questions about the Earth, pursuing their answers, and solving problems. Thus, one of the most important geographic tools is inside your head: the ability to think geographically.*

—Dr. Richard Boehm,  
September 2006

World Geography and Cultures  
author Dr. Richard Boehm

# Globes and Maps

A globe is a scale model of the Earth. Because Earth is round, a globe presents the most accurate depiction of geographic information such as area, distance, and direction. However, globes show little close-up detail. A printed map is a symbolic representation of all or part of the planet. Unlike globes, maps can show small areas in great detail.

## From 3-D to 2-D

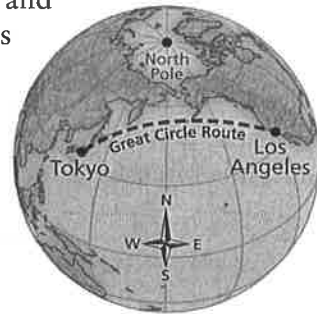
Think about the surface of the Earth as the peel of an orange. To flatten the peel, you have to cut it like the globe shown here. To create maps that are not interrupted, mapmakers, or cartographers, use mathematical formulas to transfer information from the three-dimensional globe to the two-dimensional map. However, when the curves of a globe become straight lines on a map, distortion of size, shape, distance, or area occurs.



## Great Circle Routes

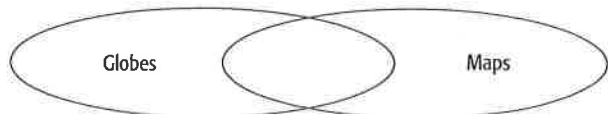
A straight line of true direction—one that runs directly from west to east, for example—is not always the shortest distance between two points on Earth. This is due to the curvature of the Earth. To find the shortest distance between any two places, stretch a piece of string around a globe from one point to the other. The string will form part of a *great circle*, an imaginary line that follows the curve of the Earth. Traveling along a great circle is called following a **great circle route**. Ship captains and airline pilots use great circle routes to reduce travel time and conserve fuel.

The idea of a great circle route is an important difference between globes and maps. A round globe accurately shows a great circle route, as indicated on the map below. However, as shown on the flat map, the great circle distance (dotted line) between Tokyo and Los Angeles appears to be far longer than the true direction distance (solid line). In fact, the great circle distance is 315 miles (507 km) shorter.



## PRACTICING THE SKILL

1. **Explain** the significance of: globe, map, cartographer, great circle route.
2. **Describe** the problems that arise when the curves of a globe become straight lines on a map.
3. **Use** a Venn diagram like the one below to identify the similarities and differences between globes and maps.

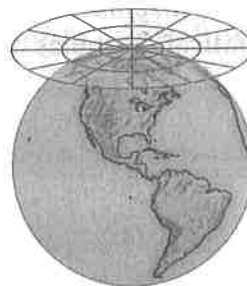


# Projections

To create maps, cartographers project the round Earth onto a flat surface—making a **map projection**. Distance, shape, direction, or size may be distorted by a projection. As a result, the purpose of the map usually dictates which projection is used. There are many kinds of map projections, some with general names and some named for the cartographers who developed them. Three basic categories of map projections are shown here: **planar**, **cylindrical**, and **conic**.

## Planar Projection

A planar projection shows the Earth centered in such a way that a straight line coming from the center to any other point represents the shortest distance. Also known as an azimuthal projection, it is most accurate at its center. As a result, it is often used for maps of the Poles.



## Cylindrical Projection

A cylindrical projection is based on the projection of the globe onto a cylinder. This projection is most accurate near the Equator, but shapes and distances are distorted near the Poles.



## Conic Projection

A conic projection comes from placing a cone over part of a globe. Conic projections are best suited for showing limited east-west areas that are not too far from the Equator. For these uses, a conic projection can indicate distances and directions fairly accurately.



## Common Map Projections

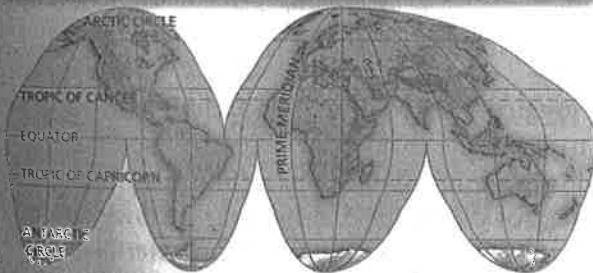
Each type of map projection has advantages and some degree of inaccuracy. Four of the most common projections are shown here.

### Winkel Tripel Projection



Most general reference world maps are the Winkel Tripel projection. It provides a good balance between the size and shape of land areas as they are shown on the map. Even the polar areas are depicted with little distortion of size and shape.

### Goode's Interrupted Equal-Area Projection

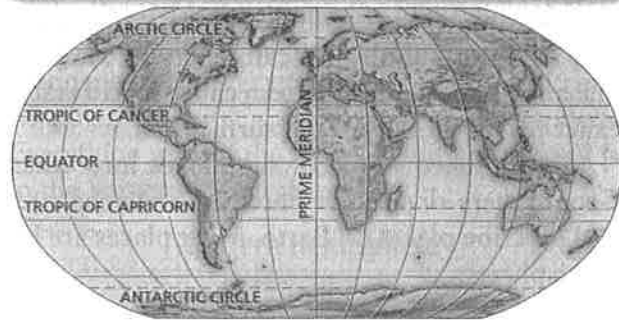


An interrupted projection resembles a globe that has been cut apart and laid flat. Goode's Interrupted Equal-Area projection shows the true size and shape of Earth's landmasses, but distances are generally distorted.

## PRACTICING THE SKILL

1. Explain the significance of: map projection, planar, cylindrical, conic, interrupted projection.
2. Which of the four common projections described above is the best one to use when showing the entire world? Why?
3. Draw a map of the world from memory, labeling continents, oceans, and as many countries as you can. Then trade maps with a partner and look for similarities and differences between your maps. Discuss how each person's spatial perspective is reflected in his or her map.

### Robinson Projection



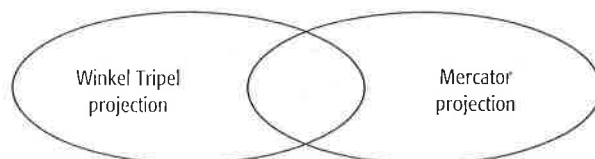
The Robinson projection has minor distortions. The sizes and shapes near the eastern and western edges of the map are accurate, and outlines of the continents appear much as they do on the globe. However, the polar areas are flattened.

### Mercator Projection



The Mercator projection increasingly distorts size and distance as it moves away from the Equator. However, Mercator projections do accurately show true directions and the shapes of landmasses, making these maps useful for sea travel.

4. Use a Venn diagram like the one below to identify the similarities and differences between the Winkel Tripel and Mercator projections.





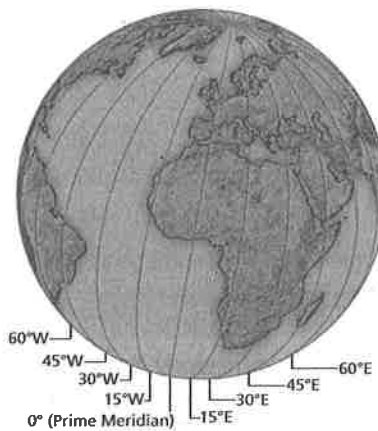
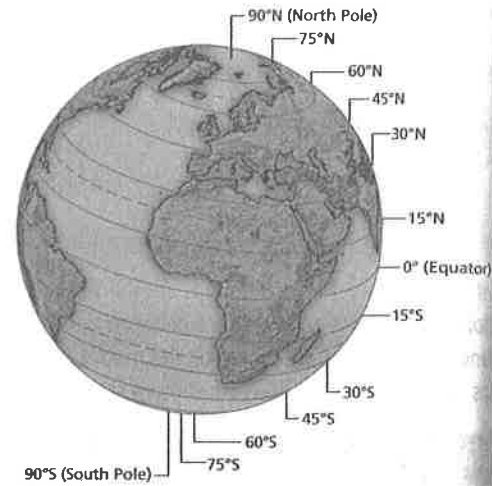
# Determining Location

Geography is often said to begin with the question *Where?* The basic tool for answering the question is **location**. Lines on globes and maps provide information that can help you locate places. These lines cross one another forming a pattern called a **grid system**, which helps you find exact places on the Earth's surface.

A **hemisphere** is one of the halves into which the Earth is divided. Geographers divide the Earth into hemispheres to help them classify and describe places on Earth. Most places are located in two of the four hemispheres.

## Latitude

Lines of **latitude**, or parallels, circle the Earth parallel to the Equator and measure the distance north or south of the Equator in degrees. The **Equator** is measured at 0° latitude, while the Poles lie at latitudes 90°N (north) and 90°S (south). Parallels north of the Equator are called north latitude. Parallels south of the Equator are called south latitude.

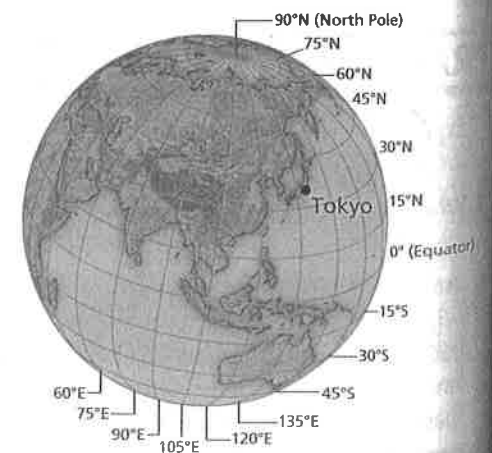


## Longitude

Lines of **longitude**, or meridians, circle the Earth from Pole to Pole. These lines measure distance east or west of the **Prime Meridian** at 0° longitude. Meridians east of the Prime Meridian are known as east longitude. Meridians west of the Prime Meridian are known as west longitude. The 180° meridian on the opposite side of the Earth is called the International Date Line.

## The Global Grid

Every place has a global address, or **absolute location**. You can identify the absolute location of a place by naming the latitude and longitude lines that cross exactly at that place. For example, Tokyo, Japan, is located at 36°N latitude and 140°E longitude. For more precise readings, each degree is further divided into 60 units called minutes.



## Northern and Southern Hemispheres

The diagram below shows that the Equator divides the Earth into the Northern and Southern Hemispheres. Everything north of the Equator is in the Northern Hemisphere. Everything south of the Equator is in the Southern Hemisphere.

### Northern Hemisphere



### Southern Hemisphere



## Eastern and Western Hemispheres

The Prime Meridian and the International Date Line divide the Earth into the Eastern and Western Hemispheres. Everything east of the Prime Meridian for 180° is in the Eastern Hemisphere. Everything west of the Prime Meridian for 180° is in the Western Hemisphere.

### Eastern Hemisphere



### Western Hemisphere



## PRACTICING THE SKILL

1. Explain the significance of: location, grid system, hemisphere, latitude, Equator, longitude, Prime Meridian, absolute location, Northern Hemisphere, Southern Hemisphere, Eastern Hemisphere, Western Hemisphere.
2. Which lines of latitude and longitude divide the Earth into hemispheres?
3. Use the Reference Atlas maps to create a chart listing the latitude and longitude of three world cities. Have a partner try to identify the cities.
4. Use a chart like the one below to identify the continents in each hemisphere. Continents will appear in more than one hemisphere.

Hemisphere	Continents
Northern	
Southern	
Eastern	
Western	



# Reading a Map

In addition to latitude and longitude, maps feature other important tools to help you interpret the information they contain. Learning to use these map tools will help you read the symbolic language of maps more easily.

## Title

The title tells you what kind of information the map is showing.

## Key

The **key** lists and explains the symbols, colors, and lines used on the map. The key is sometimes called a legend.

## Scale Bar

The **scale bar** shows the relationship between map measurements and actual distances on the Earth. By laying a ruler along the scale bar, you can calculate how many miles or kilometers are represented per inch or centimeter. The map projection used to create the map is often listed near the scale bar.

## Compass Rose

The **compass rose** indicates directions. The four **cardinal directions**—north, south, east, and west—are usually indicated with arrows or the points of a star. The **intermediate directions**—northeast, northwest, southeast, and southwest—may also be shown.

## Cities

Cities are represented by a dot. Sometimes the relative sizes of cities are shown using dots of different sizes.

## Capitals

National capitals are often represented by a star within a circle.

## Boundary Lines

On political maps of large areas, boundary lines highlight the borders between different countries and states.



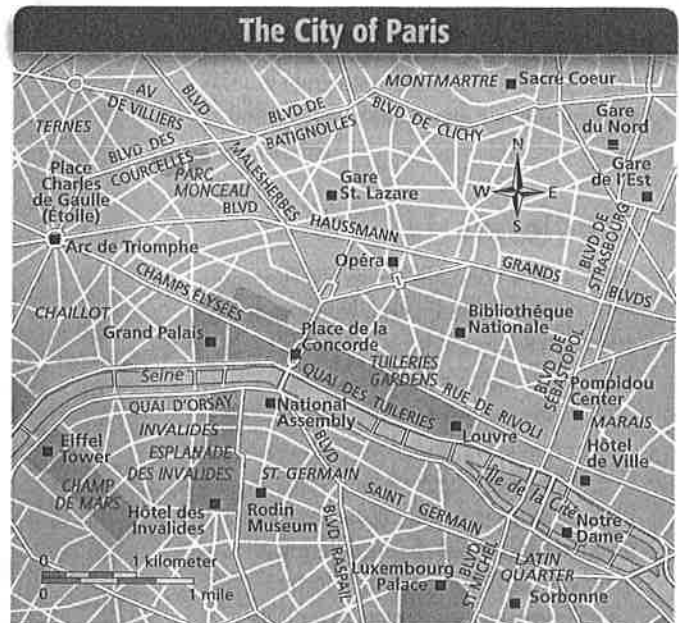
## Using Scale

All maps are drawn to a certain scale. Scale is a consistent, proportional relationship between the measurements shown on the map and the measurement of the Earth's surface.

**Small-Scale Maps** A small-scale map, like this political map of France, can show a large area but little detail. Note that the scale bar on this map indicates that about 1 inch is equal to 200 miles.



**Large-Scale Maps** A large-scale map, like this map of Paris, can show a small area with a great amount of detail. Study the scale bar. Note that the map measurements correspond to much smaller distances than on the map of France.



THE WORLD

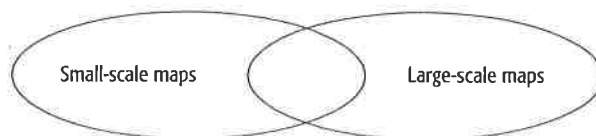
## Absolute and Relative Location

As you learned on page 8, absolute location is the exact point where a line of latitude crosses a line of longitude. Another way to indicate location is by relative location, or the location of one place in relation to another. To find relative loca-

tion, find a reference point—a location you already know—on a map. Then look in the appropriate direction for the new location. For example, locate Paris (your reference point) on the map of France above. The relative location of Lyon can be described as southeast of Paris.

### PRACTICING THE SKILL

1. Explain the significance of: key, compass rose, cardinal directions, intermediate directions, scale bar, scale, relative location.
2. Describe the elements of a map that help you interpret the information displayed on the map.
3. How does the scale bar help you determine distances on the Earth's surface?
4. Describe the relative location of your school in two different ways.
5. Use a Venn diagram to identify the similarities and differences between small-scale maps and large-scale maps.



# Physical Maps

A physical map shows the location and the **topography**, or shape of the Earth's physical features. A study of a country's physical features often helps to explain the historical development of the country. For example, mountains may be barriers to transportation, and rivers and streams can provide access into the interior of a country.

## Water Features

Physical maps show rivers, streams, lakes, and other water features.

## Landforms

Physical maps may show landforms such as mountains, plains, plateaus, and valleys.

## Relief and Elevation

Physical maps use shading and texture to show general **relief**—the differences in **elevation**, or height, of landforms. An elevation key uses colors to indicate specific measured differences in elevation above sea level.



## Political Features

Some physical maps also show political features such as boundary lines, countries, and states.

### PRACTICING THE SKILL

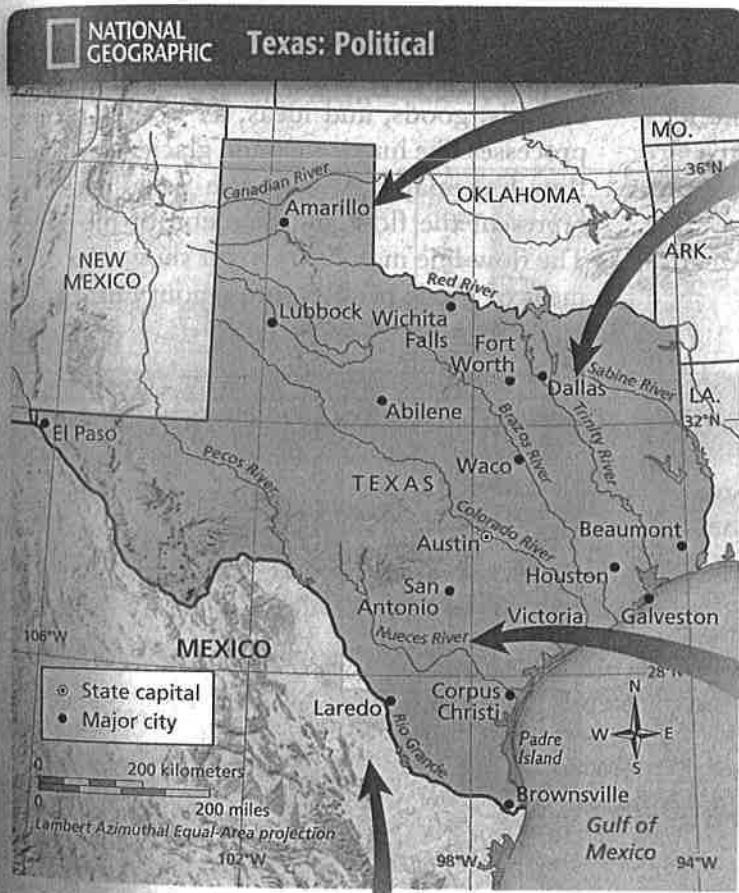
- Explain** the significance of: physical map, topography, relief, elevation.
- What** is the approximate elevation of central Texas? Of western Texas?
- Complete** a table like the one to the right to explain what you can learn from the map about each of the physical features listed.

Physical Feature	What You Can Learn from the Map
Davis Mountains	
Red River	
Gulf Coastal Plains	



# Political Maps

A **political map** shows the boundaries and locations of political units such as countries, states, counties, cities, and towns. Many features depicted on a political map are **human-made**, or determined by humans rather than by nature. Political maps can show the networks and links that exist within and between political units.



## Human-Made Features

Political maps show human-made features such as boundaries, capitals, cities, roads, highways, and railroads.

## Physical Features

Political maps may show some physical features such as relief, rivers, and mountains.

## Nonsubject Area

Areas surrounding the subject area of the map are usually a different color to set them apart. They are labeled to give you a context for the area you are studying.

## PRACTICING THE SKILL

1. Explain the significance of: political map, human-made.
2. What types of information would you find on a political map that would not appear on a physical map?
3. Complete a table like the one to the right to explain what you can learn from the map about each of the human-made features listed.

Human-Made Feature	What You Can Learn from the Map
Austin	
El Paso	
Texas state boundary	

# Thematic Maps

Maps that emphasize a single idea or a particular kind of information about an area are called **thematic maps**. There are many kinds of thematic maps, each designed to serve a different need. This textbook includes thematic maps that show climate, natural vegetation, population density, and economic activities.

## Qualitative Maps

Maps that use colors, symbols, lines, or dots to show information related to a specific idea are called **qualitative maps**. Such maps are often used to depict historical information. For example, the qualitative map below left shows resources and exports in Latin America over time.



## Flow-Line Maps

Maps that illustrate the movement of people, animals, goods, and ideas, as well as physical processes like hurricanes and glaciers, are called **flow-line maps**. Arrows are usually used to represent the flow and direction of movement. The flow-line map below right shows the movement of Slavic peoples throughout Europe.



# Geographic Information Systems

Modern technology has changed the way maps are made. Most cartographers use computers with software programs called geographic information systems (GIS). A GIS is designed to accept data from different sources—maps, satellite images, printed text, and statistics. The GIS converts the data into a digital code, which arranges it in a database. Cartographers then program the GIS to process the data and produce maps. With GIS, each kind of information on a map is saved as a separate electronic layer. This modern technology allows cartographers to make maps—and change them—quickly and easily.



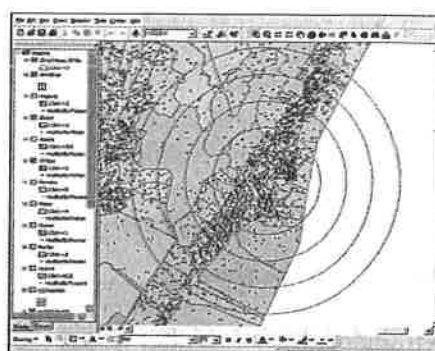
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**1** The first layer of information in a GIS pinpoints the area of interest. This allows the user to see, in detail, the area he or she needs to study. In this case, the area of study is a 5-mile (8-km) radius around Christ Hospital in Jersey City, New Jersey.



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**2** Additional layers of information are added based on the problem or issue being studied. In this case, hospital administrators want to find out about the population living near the hospital so they can offer the community the services it needs. A second layer showing African Americans who live within the 5-mile (8-km) radius has been added to the GIS.



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**3** Complex information can be presented using more than one layer. For example, the hospital's surrounding neighborhoods include other groups in addition to African Americans. A third layer showing whites who live within the 5-mile (8-km) radius has been added to the GIS. Administrators can now use this information to help them make decisions about staffing and services associated with the hospital.

THE WORLD

## PRACTICING THE SKILL

1. Explain the significance of: thematic maps, qualitative maps, flow-line maps.
2. Which type of thematic map would best show natural vegetation regions in Europe?
3. Which type of thematic map would best show trade routes between the United States, Canada, and Mexico?
4. How does GIS allow cartographers to create maps and make changes to maps quickly and easily?

5. Complete a chart like the one below by identifying three examples of each type of thematic map found in this textbook. Note the page numbers of each.

Qualitative Maps	Flow-Line Maps