Guide to Reading

Section Preview
This section explains the elements of geography and the methods geographers use to study patterns of human and physical geography.

Content Vocabulary
- site (p. 18)
- situation (p. 18)
- place (p. 18)
- region (p. 18)
- formal region (p. 18)
- functional region (p. 18)
- perceptual region (p. 18)
- ecosystem (p. 18)
- movement (p. 19)
- human-environment interaction (p. 19)
- cartography (p. 20)
- geographic information systems (GIS) (p. 21)

Academic Vocabulary
- occur (p. 17)
- traditional (p. 18)
- aspect (p. 19)
- obtain (p. 21)
- alter (p. 22)
- assist (p. 24)

Reading Strategy
Organizing As you read about the work of geographers, complete a graphic organizer similar to the one below by listing the specialized research methods geographers use.

The Geographer’s Craft

Geography is more than just learning place-names. It also has practical uses. For example, ecologist J. Michael Fay conducted a flyover to identify the physical changes and human impact on the African continent.

Voices Around the World

“The next morning we were airborne over Kruger National Park. This was the kind of thing every boy dreams of, cruising at low level over an African game park in your own little Cessna. . . . The land was covered with animal trails and water holes were heavily trodden by elephants and buffalo. It was very clear that nature was intact here. . . .

As we neared the western boundary, I could see a line along the border of the park. . . . Elephants, rhinos, and lions ruled one side while humans dominated the other. . . . As human populations grow, they tend to move closer to the artificial boundaries of protected areas until one day somebody has to put up a fence.”

—J. Michael Fay, Africa Megaflyover: Air Dispatches, National Geographic (online), June 14, 2004
The Elements of Geography

**MAIN IDEA** Geographers study the location of people and places on Earth's surface and the patterns in which they are arranged.

**GEOGRAPHY AND YOU** Is your community located near a river or in the mountains? Why do you think this is so? Read to learn how the study of geography can help you understand the world around you.

Geographers study the Earth's physical and human features and the interactions of people, places, and environments. They search for patterns in these features and interactions, seeking to explain how and why they exist or occur. In their work, geographers consider six elements: the world in spatial terms, places and regions, physical systems, human systems, environment and society, and the uses of geography.

The World in Spatial Terms

Spatial relationships are the links people and places have to one another because of their locations. For geographers, location, or a specific place on the Earth, is a reference point in the same way that dates are reference points for historians.

One way of locating a place is by describing its absolute location—the exact spot at which the place is found on the Earth. To determine absolute location, geographers use a network of imaginary lines around the Earth.

Remember that the Equator, the Prime Meridian, and other lines of latitude and longitude cross one another to form a grid system. Using the grid, you can name the absolute location of any place on Earth. This location is stated in terms of **latitude**, degrees north or south of the Equator, and **longitude**, degrees east or west of the Prime Meridian. For example, Dallas, Texas, is located at latitude 32° N (north) and longitude 96° W (west).

Although absolute location is useful, most people locate a place in relation to other places, known as its relative location. For example, New Orleans is located near the mouth of the Mississippi River. Knowing the relative location of a place helps you create mental maps to orient yourself in space and to develop an awareness of the world around you.
Using the concepts of absolute location and relative location, geographers make a distinction between the site and situation of a place. **Site** refers to the specific location of a place, including its physical setting. For example, the site of San Francisco is its location at the end of a peninsula, surrounded by the Pacific Ocean and San Francisco Bay. **Situation** is an expression of relative location. It refers to the geographic position of a place in relation to other places and its connections to other regions. San Francisco’s situation is as a port city on the Pacific coast, close to California’s agricultural lands.

**Places and Regions**

A **place** is a particular space with physical and human meaning. Every place on Earth has its own unique characteristics, determined by the surrounding environment and the people who live there. One task of geographers is to understand and explain how places are similar to and different from one another. To interpret the Earth’s complexity, geographers often group places into **regions**, or areas with similar characteristics. The defining characteristics of a region may be physical, such as climate, landforms, soils, vegetation, and animal life. A region may also be defined by human characteristics. These may include language, religion, political systems, economic systems, and population distribution.

Geographers identify three types of regions: formal, functional, and perceptual. A **formal region** is defined by a common characteristic, such as a product produced there. The Corn Belt—a band of farmland from Ohio to Nebraska in the United States—is a formal region because corn is its major crop. A **functional region** is a central place and the surrounding area linked to it. Metropolitan areas, as well as smaller cities and towns, are functional regions. A **perceptual region** is defined by popular feelings and images rather than by objective data. For example, the term “heartland” refers to a central area in which traditional values are believed to predominate.

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**Human-Environment Interaction** How does volcanic activity shape the Earth’s surface and impact human activities?
Physical Systems and Human Systems

Geography covers a broad range of topics. To make their work easier, geographers divide their subject area into different branches. The two major branches are physical geography and human geography. Physical geography focuses on the study of the Earth's physical features. It looks at climate, land, water, plants, and animal life in terms of their relationships to one another and to humans. Human geography, or cultural geography, is the study of human activities and their relationship to the cultural and physical environments. It focuses on political, economic, social, and cultural factors, such as population growth, urban development, and economic production and consumption.

Physical geography and human geography are further divided into smaller subject areas. For example, climatology is the study of weather, climate, long-term conditions of the atmosphere, and their impact on ecology and society. Historical geography is the study of places and human activities over time and the geographic factors that have shaped them.

Geographers analyze how certain natural phenomena, such as volcanoes, hurricanes, and floods, shape the Earth's surface. A Hawaiian uses traditional beliefs to describe the fascinating force of a volcano:

"We don't see her work as destruction but as cleansing. She's a creator. When she comes through, she wipes the land clean and leaves us new fertile ground. We don't get mad. It is all hers to begin with."

—Jennifer S. Holland, "Red Hot Hawaii," National Geographic, October 2004

Geographers study how physical features interact with plants and animals to create, support, or change ecosystems. An ecosystem is a community of plants and animals that depend upon one another and their surroundings, for survival. Geographers also examine how people shape the world—how they settle the Earth, form societies, and create permanent features. A recurring theme in geography is the ongoing movement of people, goods, and ideas. For example, new people entering a long-established society usually bring different ideas and practices that may transform that society's existing culture. In studying human systems, geographers look at how people compete or cooperate to change or control aspects of the Earth to meet their needs.

Environment and Society

Human-environment interaction, or the study of the interrelationship between people and their physical environment, is another theme of geography. Geographers examine the ways people use their environment, how and why they change it, and what consequences result from these changes. In some cases the physical environment affects human activities. For example, mountains and deserts often pose barriers to human movement. In other instances human activities, such as building a dam, cause changes to the physical environment. By understanding how the Earth's physical features and processes shape and are shaped by human activity, geographers help societies make informed decisions.
The Uses of Geography

Geography provides insight into how physical features and living things developed in the past. It also interprets current trends to plan for future needs. Governments, businesses, and individuals use geographic information in planning and decision making. Data on physical features and processes can determine whether a site is suitable for human habitation or has resources worth developing. Geographic information on human activities, such as population growth and migration, can help planners decide whether to build new schools or highways in a particular place. As geographers learn more about the relationships among people, places, and the environment, their knowledge helps us plan and build a better future.

READING CHECK Location How is absolute location different from relative location?

Research Methods

MAIN Idea Geographers use different research methods to conduct their work.

GEOGRAPHY AND YOU How do you prepare to write a research report? Read to learn how geographers organize and study geography.

Geographers use specialized research methods in their work. These methods include direct observation, mapping, interviewing, statistics, and the use of technology.

Direct Observation

Geographers use direct observation to study the Earth and the patterns of human activities that take place on its surface. They will often visit a place to gather specific information about it and its geographic features. Geographers also employ remote sensing to study the Earth, using aerial photographs and satellite images. For example, aerial photographs or satellite images can be used to locate mineral deposits or to determine the size of freshwater sources.

Mapping

Maps are essential to geographers. Specialist who make and design maps are known as cartographers. Their area of work, known as cartography, involves designing and making maps.

Many findings from geographic research can be shown on maps better than they can be explained in written text. Cartographers select complex pieces of information about an area and present them in a more understandable form on a map. In this way they show the location features, patterns, and relationships of people, places, and things. In addition, maps allow visual comparison between places and regions. For example, a geographer might compare population density maps of two counties in order to determine where to build new schools.

Interviewing

To answer a geographic question, geographers must often go beyond observation. In many cases, they want to find out how people feel about certain places. They also may want to examine the ways in which people’s beliefs and attitudes have affected the physical environment.
Skills for Thinking Like a Geographer

<table>
<thead>
<tr>
<th>Skill</th>
<th>Examples</th>
<th>Tools and Technologies</th>
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| Asking Geographic Questions—helps you pose questions about your surroundings | • Why has traffic increased along this road?  
• What should be considered when building a new community sports facility? | • Maps  
• Globes  
• Internet  
• Remote sensing  
• News media |
| Acquiring Geographic Information—helps you answer geographic questions | • Compare aerial photographs of a region over time.  
• Design a survey to determine who might use a community facility. | • Direct observation  
• Interviews  
• Reference books  
• Satellite images  
• Historical records |
| Organizing Geographic Information—helps you analyze and interpret information you have collected | • Compile a map showing the spread of housing development over time.  
• Summarize information obtained from interviews. | • Field maps  
• Databases  
• Statistical tables  
• Graphs  
• Diagrams  
• Summaries |
| Analyzing Geographic Information—helps you look for patterns, relationships, and connections | • Draw conclusions about the effects of road construction on traffic patterns.  
• Compare information from different maps that show available land and zoning districts. | • Maps  
• Charts  
• Graphs  
• GIS  
• Spreadsheets |
| Answering Geographic Questions—helps you apply information to real-life situations and problem solving | • Present a report conveying the results of a case study.  
• Suggest locations for a new facility based on geographic data gathered. | • Sketch maps  
• Reports  
• Research papers  
• Oral or multimedia presentations |

One of the most important geographic tools is the ability to think geographically. The five skills identified above are key to geographic understanding.

1. **Place** What types of information can you gain from a map that would help you ask questions about why traffic has increased along a specific road?

2. **Regions** Why are the news media and the Internet important tools for geographers?

Such information is obtained by interviewing. Geographers choose a particular group of people for study. Instead of contacting everyone in that group, however, geographers talk to a carefully chosen sample whose answers represent the whole group.

**Analyzing Statistics**

Some of the information geographers use is numerical. Temperature and rainfall data indicate a region’s climate, for example. Geographers use computers to organize and present this information. They also analyze the data to find patterns and trends. For example, census data can be studied to learn about the age, ethnic, and gender makeup of the population. After identifying these patterns and trends, geographers use statistical tests to see whether their ideas are valid.

**Using Technology**

As noted in the chart above, geographers often use scientific instruments in their work. They especially depend on advanced technological tools, such as satellites and computers. Satellites orbiting the Earth carry remote sensors, high-tech cameras, and radar that gather data and images related to the Earth’s environment, weather, human settlement patterns, and vegetation. Geographic information systems (GIS) are computer tools that process and organize data and satellite images with other types of information gathered by geographers and other scientists. GIS technology can be used for many purposes. For example, urban planners use it to help determine where to build roads. Biologists use it to monitor wildlife populations in a specific area. Public safety officials use it to pinpoint safe and efficient evacuation routes from hurricane paths.

The development of computer technology has also transformed the process of mapmaking. Today, most cartographers rely on computers and computer software to make maps. Each type of data on a map is kept as a separate “layer” in the map’s digital files. This method allows cartographers to make and change maps quickly and easily.

**Reading Check**

**Location** How has technology changed the way maps are created?