

Chapter 2 – A Spatial Way of Thinking



1. Introduction

In the late summer of 1854, a highly contagious disease called *cholera* struck a neighborhood in London, England. People suddenly began suffering cramps, vomiting, and terrible thirst. So severe was the disease that many people died within hours of their first symptoms. In just 10 days, the disease killed about 500 people. Wagons groaned under the weight of corpses being taken away for mass burial.

No one knew how cholera spread or had any idea how to contain the outbreak—except a doctor named John Snow. Snow convinced officials to remove the handle from a water pump on Broad Street so that no one could draw water from the well there. As the cholera outbreak slowed, Snow knew he had correctly identified the source of infection: polluted drinking water.

Snow had, in effect, solved the mystery by using the skills of the geographic inquiry process. First he asked a question: How was cholera spread? Next he acquired information by going door to door to find out where people were dying. He then organized his information on a neighborhood map, marking the house of each cholera death. His next step was to analyze his map. Thus he was able to answer his question: The Broad Street pump must be spreading the disease, because most of the deaths were clustered around it.

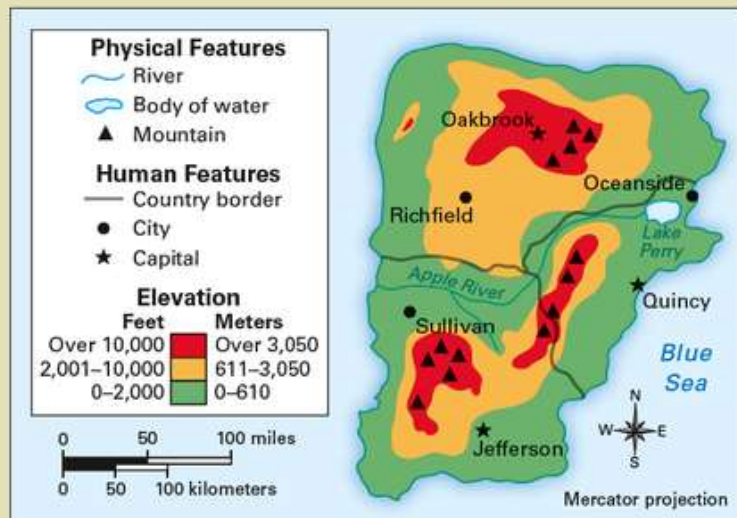
John Snow's map is an example of a [thematic map](#). A thematic map presents information related to only one theme, or topic. In this chapter, you will learn how to identify and read different types of thematic maps. In addition, you will see how geographers use these tools to make sense of Earth's physical and human features.

Essential Question

Why do geographers use a variety of maps to represent the world?

Geographers use maps for many purposes. A map legend tells you what kind of information the map shows. Colors, for example, can show different climates. Symbols can show physical features like rivers. Or they can identify human features such as roads and cities. Keep this fictitious map and its legend in mind as you try to answer the Essential Question.

Graphic Organizer





2. The Geographic Setting

Thematic maps are all around us. Tune in to a news program and you're likely to see a weather map with the high and low temperatures for towns in your area. To find your way on the local bus system, you might use a map showing bus routes. By focusing on a specific topic, or theme, maps like these show information about some aspect of physical or human geography.

Thematic Maps Can Show Physical Geography

Some thematic maps focus on physical geography. For instance, they may display Earth's **physical features**, or the natural parts of Earth's surface. Such features include **landforms** like mountains, valleys, plains, and **plateaus**. Physical features also include bodies of water such as oceans, seas, rivers, and lakes.

Thematic maps can also illustrate other aspects of the physical environment. For example, some maps focus on **climate**, or long-term weather patterns. Climate maps show how much rainfall different areas receive. They also show how hot or cold various places tend to be in winter and summer.

Climate has a tremendous effect on the types of **vegetation**, or trees and other plants, that will grow in an area. You can see this by comparing a climate map of Earth with a vegetation map. A vegetation map shows the kinds of trees and other plants that grow in various places. In many ways it looks like a climate map, although other factors also affect what will grow where.

Thematic Maps Can Show Human Geography

Thematic maps can also focus on human geography. John Snow's map of the cholera deaths near the Broad Street pump is a good example. Another example is a political map. The political map on the next page shows the borders of the 50 U.S. states. Political maps of larger areas show the borders between countries. In addition to borders, political maps also show important cities, such as the capitals of states and countries.

Another type of thematic map shows **population density**. This is the average number of people living in a unit of area, such as a square mile. The higher the number, the more crowded an area is. A population density map reveals where large numbers of people cluster.

Besides showing where people live, a thematic map can show what they do. A map of **economic activity** focuses on the ways people produce, buy, and sell goods and services. This kind of map might show the main types of business and industry in an area. It might also show the **natural resources** that fuel the area's economy. Natural resources are useful items found in nature, such as wood, coal, and oil.

► Geoterm

climate the pattern of weather over a long period of time

economic activity any action that relates to the making, buying, and selling of goods and services

landform any natural feature of Earth's surface that has a distinct shape. Landforms include major features such as continents, plains, plateaus, and mountain ranges. They also include minor features such as hills, valleys, canyons, and dunes.

physical feature any natural characteristic of Earth's surface, such as landforms and bodies of water

population density the average number of people who live in a unit of area, such as a square mile. Population density measures how crowded an area is.

region an area defined by one or more natural or cultural characteristics that set it apart from other areas

thematic map a map that shows a particular theme, or topic

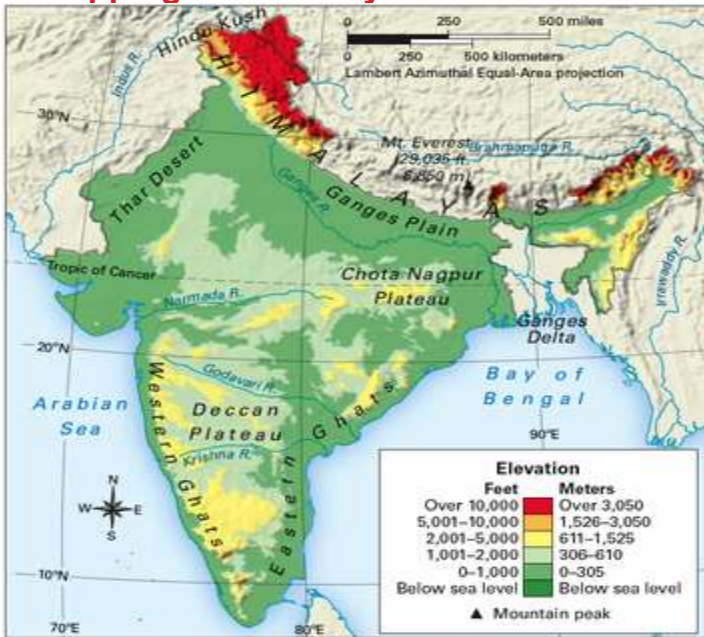
vegetation all the plants and trees in an area

A Map's Title and Legend State Its Theme

To read a thematic map, first look at a map's title. The title usually states the topic of the map. Then look at the map legend to determine how to read the map's symbols. On the U.S. political map, the legend shows the symbols for the national and state capitals. A map legend may also explain how the map uses colors. For instance, a thematic map might use colors to show differences in elevation or population density.



3. Mapping Earth's Physical Features



In the winter, snowboarders look for a snowy mountain to practice their sport on. In the summer, vacationers seek to cool off by a lake or river. These are just three of the landforms and bodies of water that you might see on a physical features map.

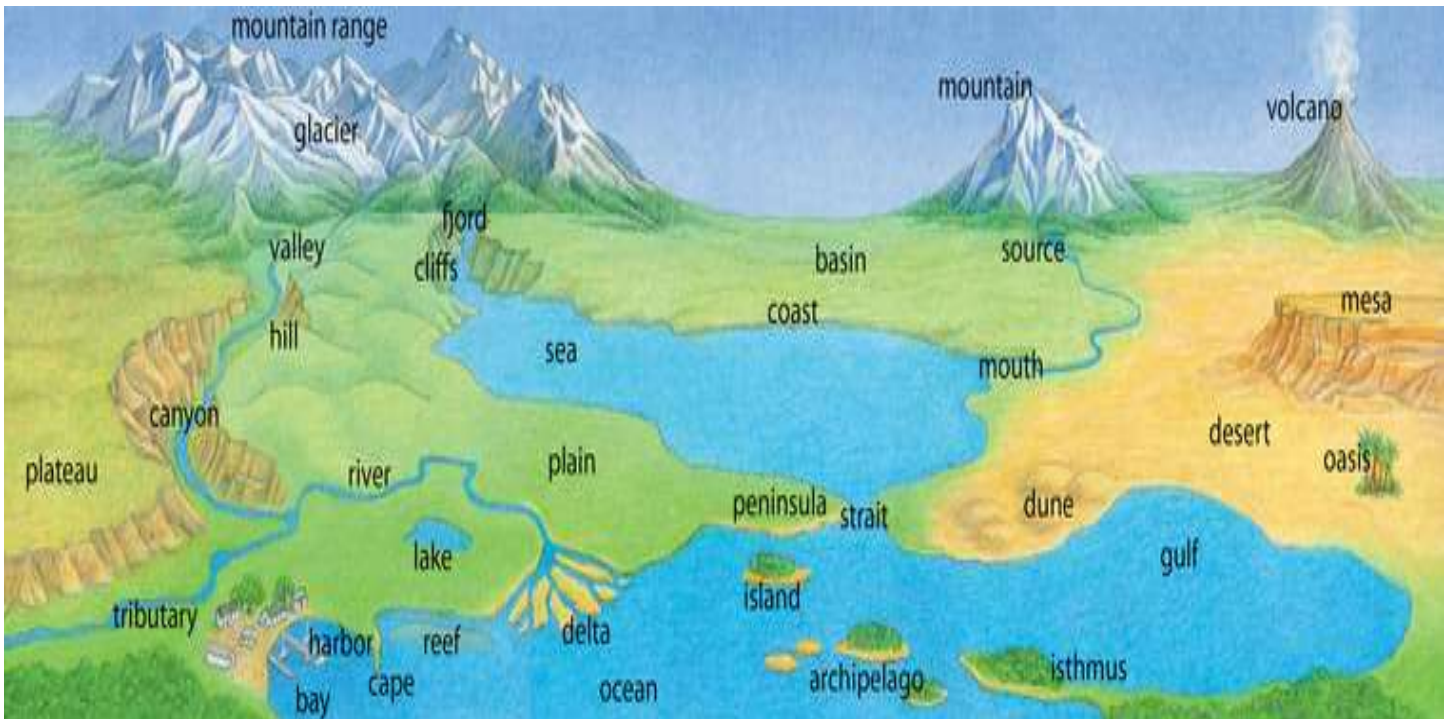
Common Landforms

Geographers have given names to the many landforms found on Earth. Some landforms have distinctive shapes when viewed from above. A long, narrow peninsula, for example, juts out from a continent into the ocean and is surrounded by water on three sides. Other landforms have distinct shapes when viewed from ground level. Mountain ranges tower over low, flat plains. A plateau is a raised, flat area of land. A canyon is a deep, narrow valley with steep sides.

Physical features maps show the shapes of features as seen from above. They also show the [elevation](#), or height above sea level, of various features. These maps typically use colors and shading to show changes in elevation.

Bodies of Water

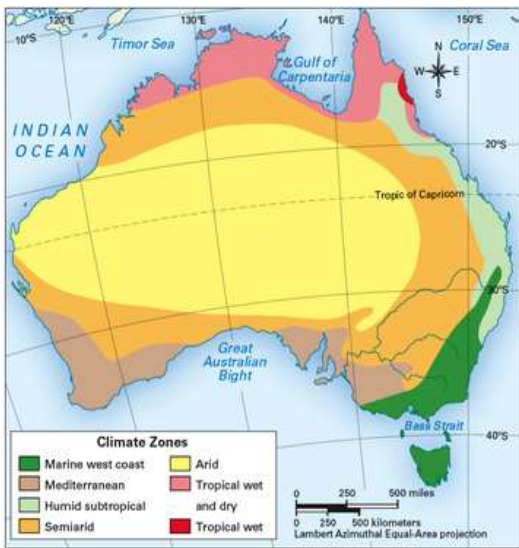
Geographers also label bodies of water on physical features maps. Many kinds of water bodies appear on continents. For instance, rivers flow from mountains and make their way to the sea. Lakes are entirely surrounded by land. Other water bodies are created where oceans and seas meet continents. A bay is part of an ocean that is enclosed by an inward-curving stretch of coastline. A [gulf](#) is a body of water that cuts deeply into the shoreline and is enclosed by land on three sides.



4. Hot, Cold, Wet, Dry: Earth's Climates

Do you check a weather report each morning to see what the day will be like? Are most days sunny? Or does it rain a lot where you live? Such long-term patterns in weather are called *climate*.

Climate Zones To study climates, geographers divide Earth into [climate zones](#). Each zone has a particular pattern of temperature and [precipitation](#): rain, snow, or other forms of moisture. This pattern is often shown on a [climagraph](#), like those you see below.

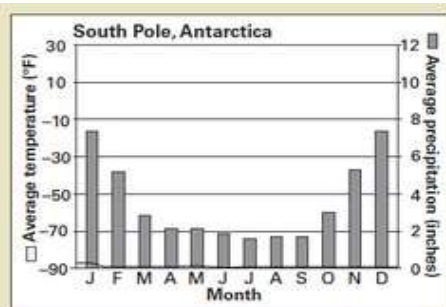


A climograph shows the average temperature and precipitation in a place over a year. The letters at the bottom of the graph stand for the months of the year. The curved line indicates the average monthly temperatures, while the bars show the average monthly precipitation.

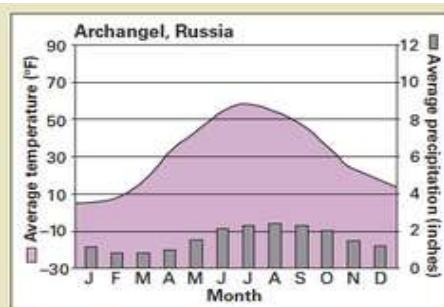
Location Affects Climate

Many factors affect a location's climate, but none is more important than latitude. Places in tropical latitudes, near the equator, get the most direct rays from the sun all year. Most of these places have hot weather year-round. Places at high latitudes, close to the North and South poles, receive much less sunlight and remain quite cold all year.

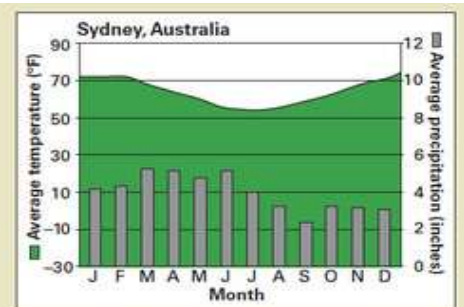
Elevation, or altitude, also affects climate. Places at high elevations have colder climates than those lower down. Large bodies of water can also affect an area's climate. In coastal areas, ocean winds and warm-water currents keep temperatures even year-round. Places farther inland have more extreme climates, with hotter summers and colder winters. You'll learn more about the factors that affect climate throughout this book.



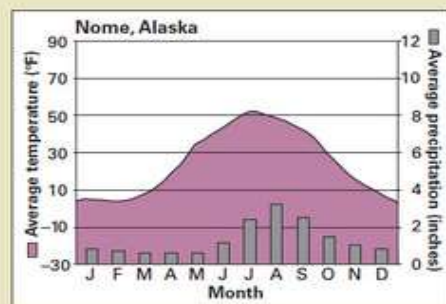
ice cap very cold all year with permanent ice and snow



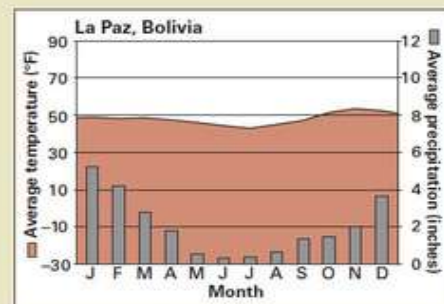
subarctic cold, snowy winters and cool, rainy summers



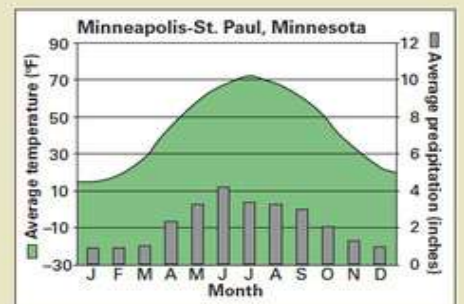
marine west coast warm summers, cool winters, and rainfall all year



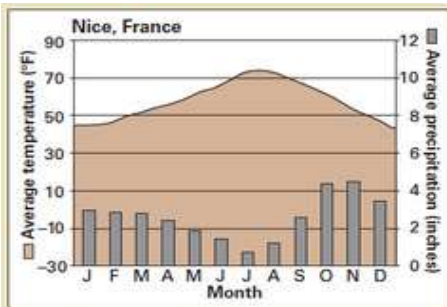
tundra very cold winters, cold summers, and little rain or snow



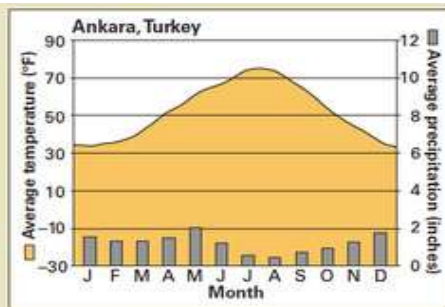
highlands temperature and precipitation vary with latitude and elevation



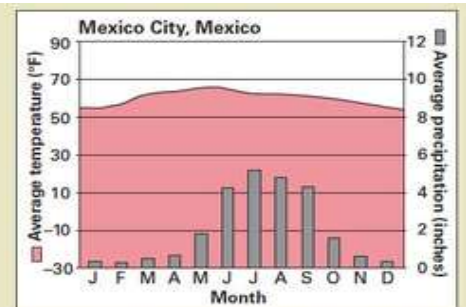
humid continental warm, rainy summers and cool, snowy winters



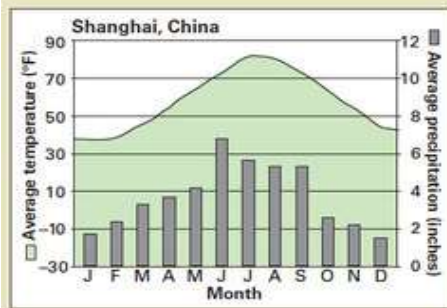
Mediterranean warm all year with dry summers and short, rainy winters



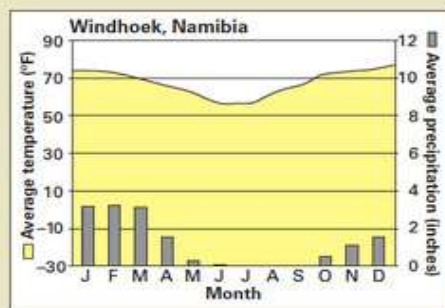
semiarid hot, dry summers and cool, dry winters



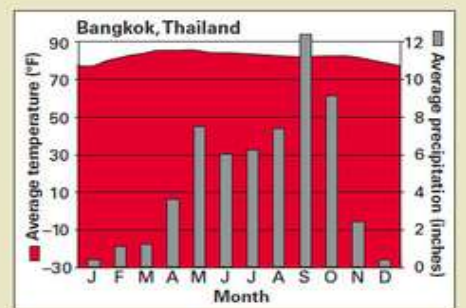
tropical wet and dry hot all year with rainy and dry seasons



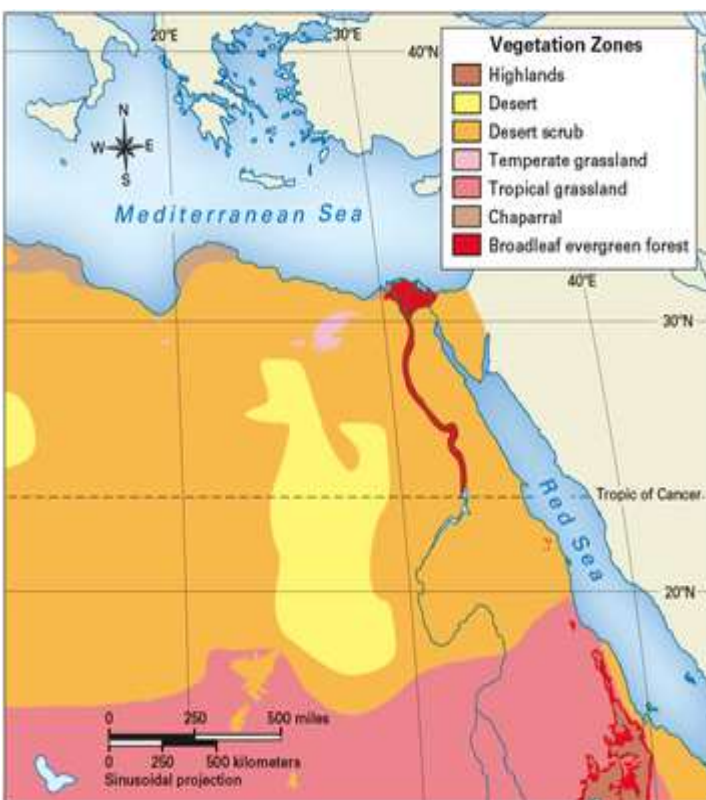
humid subtropical hot, rainy summers and mild winters with some rain



arid hot and dry all year with very little rain



tropical wet hot and rainy all year



5. Trees and Other Plants: Earth's Vegetation

Think about the climate where you live. Now think about the kinds of trees and other plants that grow nearby. In an **arid** climate like a **desert**, you might see hardy cacti and scrubby brush. In a **humid continental** climate, you might see lofty fir and pine trees that stay green all year. Climate has a major effect on the kind of vegetation that grows in a place.

Vegetation Is Adapted to Its Environment

Plants of some kind grow nearly everywhere on Earth. But in order to survive, plants must adapt to their environment.

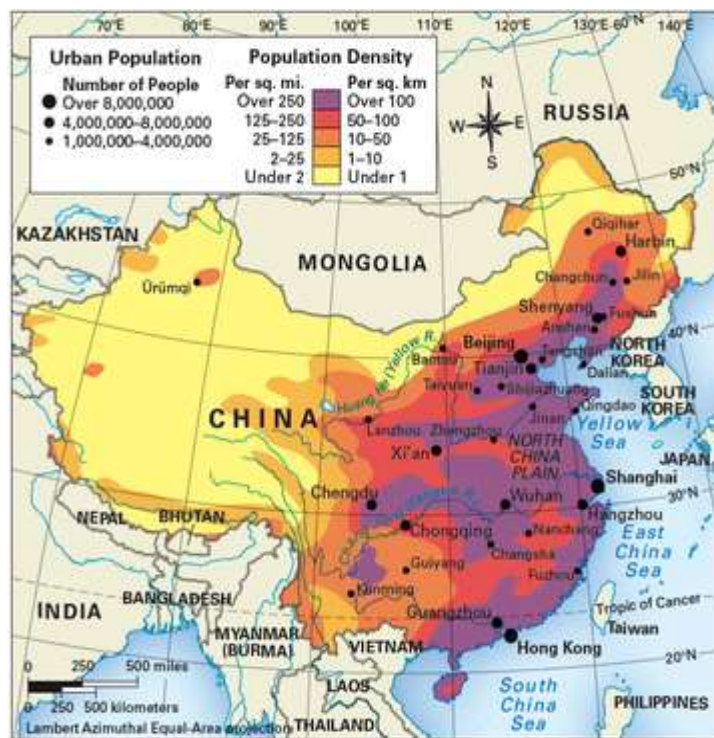
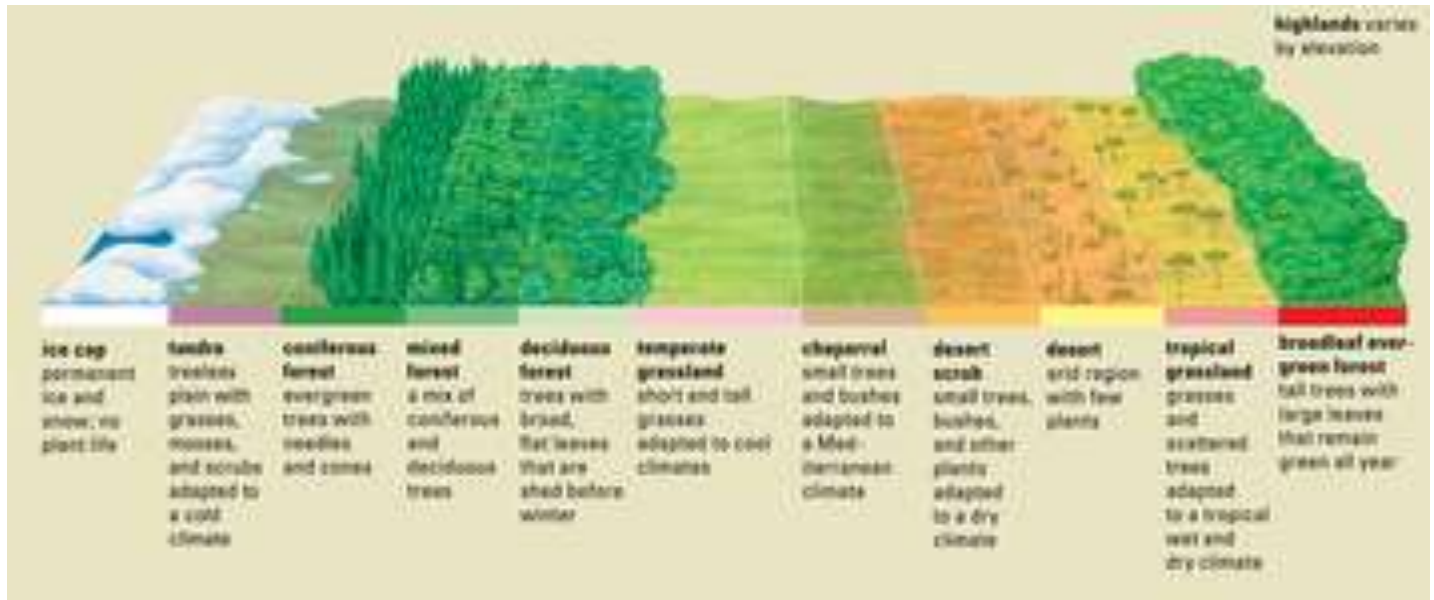
Plants have found ways to adapt to even extreme environments. A tundra climate zone is very cold and dry, yet small plants and bushes grow there and wildflowers blossom in the tundra's short summer. In arid climates, cacti can survive very hot days and go for long periods without water. Other kinds of vegetation need plentiful precipitation to thrive.

In addition to climate, other factors affect what plants grow where. Among them are elevation, amount of sunlight, and richness of the soil.

Global Vegetation Zones

Geographers study where different plants grow by dividing the world into **vegetation zones**. In each zone, a certain mix of plants has adapted to similar conditions.

Like climate zones, vegetation zones are affected by latitude and elevation. They range from the barren ice cap zones at the poles to the dense broadleaf evergreen forest zones near the equator. Highlands vegetation zones are usually on mountain slopes.



6. Where People Live: Population Density

In 2007, about 8 million people resided in New York City. They were jammed into an area of about 300 square miles. Compare this with the town of Skwentna, Alaska, where approximately 150 people were spread out over about 450 square miles. When it comes to crowding, these two places are about as different as they can be. Geographers show these kinds of differences using population density maps.

Population Density Measures Crowding

Population density tells us how crowded a place is. To calculate the density of a place, divide the total number of people living there by the location's total land area. The higher the result, the more crowded the place is. In 2007, New York City had a population density of more than 26,000 people per square mile. In contrast, Skwentna had less than 1 person per square mile.

Population density affects how people live. In Skwentna, houses are so spread out that people rarely see their neighbors. There are no roads, so residents use airplanes, boats, or snowmobiles to get to the local store and the post office. Skwentna's version of rush hour comes in February, when dogsled racers speed through town.

Things are far different in New York City. Many people live in high-rise apartments, where they may have hundreds of neighbors just in their own building. Every day at rush hour, New Yorkers pour into railroads, ferries, and underwater tunnels to get to their destinations. Millions of "straphangers" hold on tight as they jostle one another in the city's crowded subways.

Population Density from High to Low

Population density is a measure of crowding. Some countries are very densely populated. Others are not. These photographs show places with different population densities.



More Than 250 People per Square Mile

Dhaka, Bangladesh, is one of the most crowded places on Earth. On average, many more than 250 people live in a square mile of this busy city.



125 to 250 People per Square Mile

Austria is a fairly crowded country. On average, between 125 and 250 people live in every square mile of this mountainous land.



25 to 125 People per Square Mile

This uncrowded New England village has a lot of space for living. On average, between 25 and 125 people live in every square mile of the town.



2 to 25 People per Square Mile

This photograph of Ireland's countryside shows a thinly populated country. Ireland has some big cities. But in most of Ireland, there is an average of 2 to 25 people per square mile.



Fewer Than 2 People per Square Mile

These herders in Mongolia live in an almost empty country. Fewer than 2 people live in every square mile of areas like this one.



Hunting and Gathering in Greenland

Many people still hunt animals and gather plants for food. Most live in small groups that move from place to place. This hunter in Greenland tracks polar bears and seals across ice and snow.



Subsistence Farming in Africa

Some farmers grow only enough crops to feed their own families. This is called subsistence farming. More than half of the land in Africa is used for subsistence farming. Most of the subsistence farmers in Africa are women.



Commercial Farming in Colombia

Commercial farmers raise crops or livestock to sell. Commercial farms are often very large. Many grow a variety of crops. Others, like this coffee farm in Colombia, specialize in just one crop.



Nomadic Herding in China

Millions of people around the world are nomadic herders. They move around often to find food and water for their animals. This herder in China uses the animals' milk, hides, and other products.

7. Economic Activity: Land and Resources

Do you like chocolate? This sweet treat comes from cocoa beans, the fruit of the cacao tree. The cacao tree grows only in hot, humid tropical areas near the equator. However, the factories that convert cocoa beans into chocolate are found mostly in Europe and the United States. The locations of cacao [plantations](#) and chocolate factories are examples of the kind of information you might see on an economic activity map.

Land Use Shows How People Make a Living

Economic activity maps often show patterns of [land use](#), or the way people use the land they live on to meet their needs. In some areas, for example, people use land for farming or for grazing large flocks of cattle, goats, and sheep. In other areas, they may use land for mining.

Natural Resources Affect Economic Activities

Economic activity also depends on a country's natural resources. [Forestry](#), or the harvesting of trees to produce wood products, is important in forested areas. Near oceans, fishing is an important industry.

Some resources lie concealed beneath the ground. This is true of mineral resources such as iron, copper, and gold. [Fossil fuels](#) such as oil, coal, and natural gas are extracted from Earth and burned to meet people's energy needs. Uranium, another underground energy resource, provides fuel for nuclear power plants. In contrast, moving water is an easy-to-find energy resource. Dams can be built on rivers to harness the moving water's energy and convert it to [hydroelectric power](#).



Livestock Raising in Australia

Cattle, sheep, and goats are raised on huge ranches. More than half of the farmland in Australia is used for raising sheep and cows. Australian livestock raisers lead the world in production of wool for clothing and carpets.



Commercial Fishing in Asia

Many people make their living by fishing the world's oceans, lakes, and rivers. The Pacific Ocean yields more than half the world supply of fish. In 2004, 41 million people worked in the fishing industry. More than 30 percent were in Asia.



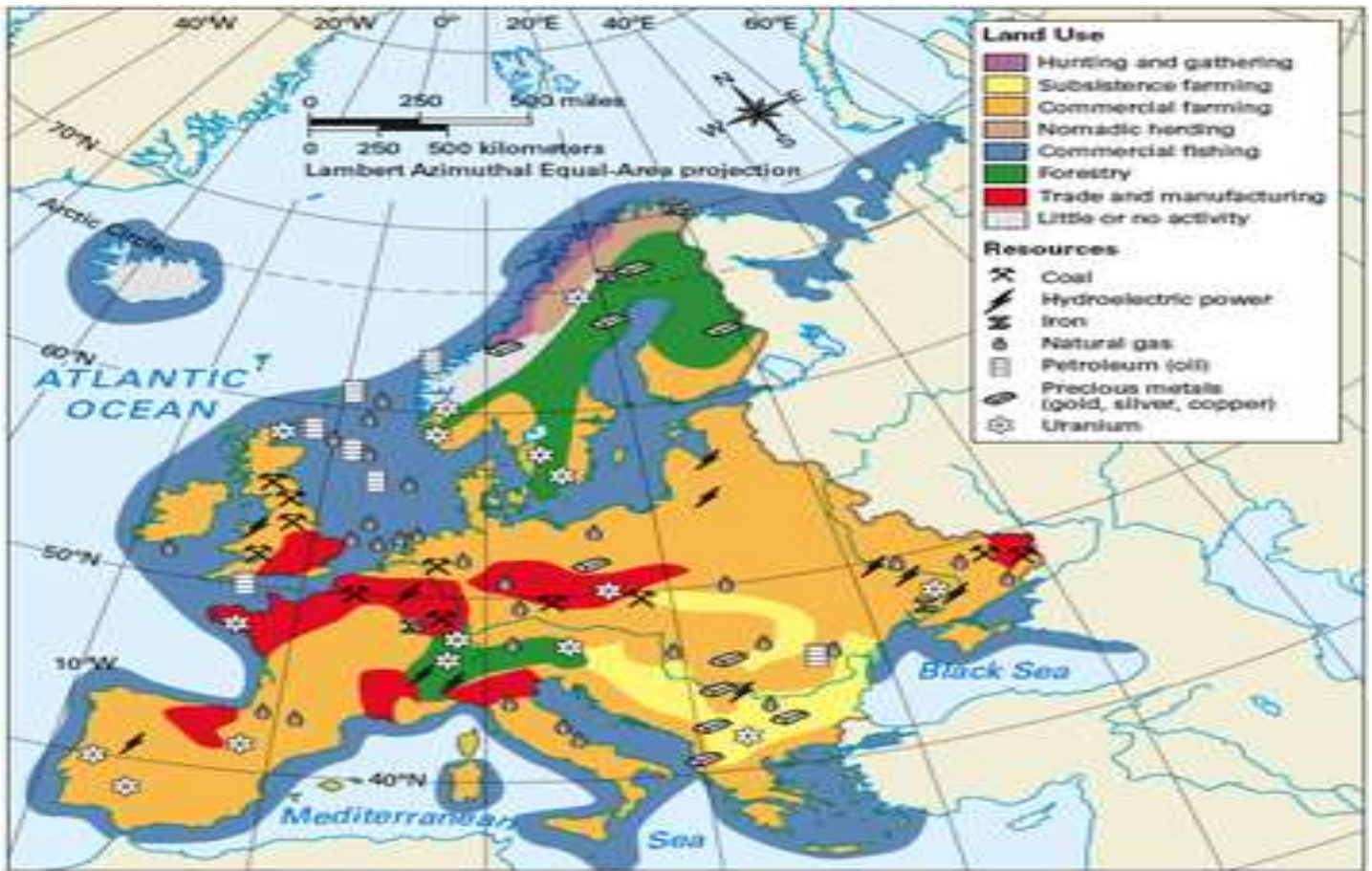
Forestry in the United States

Forestry uses trees as a resource for making homes, furniture, and paper. In 2005, the United States was the leading supplier of wood in the world. The United States also used up more forest resources than any other country.



Trade and Manufacturing in Ireland

Manufacturing turns resources into goods to sell. In this Irish factory, workers assemble computers for shipment around the world.



8. Organizing Earth's Surface: Regions

As you have learned, geographers use many kinds of maps to help make sense of the world. Some of these maps focus on physical geography; others focus on human geography. All of them reveal interesting patterns to explore.

Geographers use these patterns to organize Earth's surface into regions. A region is an area with one or more features that set it apart from other areas. As you will see, the concept of region allows geographers to divide the world in useful ways.

Unique Features Define a Region

Think about the community in which you live. Does it have a business district? A shopping mall? An industrial park? A civic or community center? A residential neighborhood? Each of these areas has unique features that set it apart from other parts of the community. You might think of one area as a business region, another as a shopping region, and still another as a residential region. Each region looks different, has a different purpose, and has different requirements.

Geographers define regions in several ways. The Sunbelt is a region defined by physical, or natural, features. It is a region made up of states in the southern and southwestern United States, from Florida to California. What sets the Sunbelt apart from other regions is its warm, sunny climate. The Corn Belt, in contrast, is a region defined by human features. It is made up of states in the center of the country, such as Indiana, Illinois, and Iowa, where raising corn is an important economic activity.



Dividing the World into Seven Major Regions

The world is a very large place to make sense of. For this reason, geographers usually divide it into regions to study. These world regions are still very large, but each has its own distinct features.

This book divides the world into seven major regions. Each region is shown in a different color on the world regions map below. These colors are your guide to finding each region in this book. Your study of a region will begin with an introduction to its most important physical and human features. In that introduction, you will begin to see what makes each of these regions unique.

Summary

Geographers use maps for many different purposes. Thematic maps, which present information related to only one theme, help geographers make sense of Earth's physical and human features. Because thematic maps focus on one topic, geographers are able to find out specific information about a place. Thematic maps can tell information about physical features of a place or even what type of economic activities take place there.

The world is divided into seven major regions. These regions are divided into smaller regions. Because unique features define a region, different types of maps apply to different places.