The story of the world begins with geography—the study of the earth in all of its variety. Geography describes the earth’s land, water, and plant and animal life. It is the study of places and the complex relationships between people and their environment.

The resources in this handbook will help you get the most out of your textbook—and provide you with skills you will use for the rest of your life.
To understand how our world is connected, some geographers have broken down the study of geography into five themes. The Five Themes of Geography are (1) location, (2) place, (3) human/environment interaction, (4) movement, and (5) regions. You will see these themes highlighted in the Section and Chapter Assessments in The World and Its People.

Six Essential Elements

Recently, geographers have broken down the study of geography into Six Essential Elements, which are explained here. Being aware of these elements will help you sort out what you are learning about geography.

Element 1: The World in Spatial Terms

Geographers first take a look at where a place is located. Location serves as a starting point by asking “Where is it?” Knowing the location of places helps you develop an awareness of the world around you.

Element 2: Places and Regions

Place has a special meaning in geography. It is not just a geographic location. It also describes characteristics. It might describe physical characteristics such as landforms, climate, and plant or animal life. Or it might describe human characteristics, including language and way of life.

To help organize their study, geographers often group places into regions. Regions are united by one or more common characteristics.

Element 3: Physical Systems

When studying places and regions, geographers analyze how physical systems—such as hurricanes, volcanoes, and glaciers—shape the earth’s surface. They also look at communities of plants and animals that depend upon one another and their surroundings for survival.
Environment and Society
How does the relationship between people and their natural surroundings influence the way people live? Geographers study how people use the environment and how their actions affect the environment.

Human Systems
Geographers also examine human systems, or how people have shaped our world. They look at how boundary lines are determined and analyze why people settle in certain places and not in others. A key theme in geography is the continual movement of people, ideas, and goods.

The Uses of Geography
Knowledge of geography helps us understand the relationships among people, places, and environments over time. Applying geographic skills helps you understand the past and prepare for the future.
Hemispheres

To locate places on the earth, geographers use a system of imaginary lines that crisscross the globe. One of these lines, the Equator, circles the middle of the earth like a belt. It divides the earth into “half spheres,” or hemispheres. Everything north of the Equator is in the Northern Hemisphere. Everything south of the Equator is in the Southern Hemisphere.

Another imaginary line runs from north to south. It helps divide the earth into half spheres in the other direction. Find this line—called the Prime Meridian—on a globe. Everything east of the Prime Meridian for 180 degrees is in the Eastern Hemisphere. Everything west of the Prime Meridian for 180 degrees is in the Western Hemisphere.
Lines on globes and maps provide information that can help you easily locate places on the earth. These lines—called latitude and longitude—cross one another, forming a pattern called a grid system.

**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 at 0° latitude, while the North Pole lies at latitude 90°N (north).

**Longitude**
Lines of longitude, or meridians, circle the earth from Pole to Pole. These lines measure distances east or west of the starting line, which is at 0° longitude and is called the Prime Meridian. The Prime Meridian runs through the Royal Observatory in Greenwich, England.

**Absolute Location**
The grid system formed by lines of latitude and longitude makes it possible to find the absolute location of a place. Only one place can be found at the point where a specific line of latitude crosses a specific line of longitude. By using degrees (°) and minutes (′) (points between degrees), people can pinpoint the precise spot where one line of latitude crosses one line of longitude—an absolute location.
From Globes to Maps

The most accurate way to depict the earth is as a globe, a round scale model of the earth. A globe gives a true picture of the continents’ relative sizes and the shapes of landmasses and bodies of water. Globes accurately represent distance and direction.

A map is a flat drawing of all or part of the earth’s surface. Unlike globes, maps can show small areas in great detail. Maps can also display political boundaries, population densities, or even voting returns.

From Globes to Maps

Maps, however, do have their limitations. As you can imagine, drawing a round object on a flat surface is very difficult. Cartographers, or mapmakers, use mathematical formulas to transfer information from the round globe to a flat map. However, when the curves of a globe become straight lines on a map, the size, shape, distance, or area can change or be distorted.

Great Circle Routes

Mapmakers have solved some problems of going from a globe to a map. A great circle is an imaginary line that follows the curve of the earth. A line drawn along the Equator is an example of a great circle. Traveling along a great circle is called following a great circle route. Airplane pilots use great circle routes because they represent the shortest distances from one city to another.

The idea of a great circle shows one important difference between a globe and a map. Because a globe is round, it accurately shows great circles. On a flat map, however, the great circle route between two points may not appear to be the shortest distance. See the maps to the right.

Mapmaking with Technology

Technology has changed the way maps are made. Most cartographers use software programs called geographic information systems (GIS). This software layers map data from satellite images, printed text, and statistics. A Global Positioning System (GPS) helps mapmakers and consumers locate places based on coordinates broadcast by satellites.
Imagine taking the whole peel from an orange and trying to flatten it on a table. You would either have to cut it or stretch parts of it. Mapmakers face a similar problem in showing the surface of the round earth on a flat map. When the earth’s surface is flattened, big gaps open up. To fill in the gaps, mapmakers stretch parts of the earth. They choose to show either the correct shapes of places or their correct sizes. It is impossible to show both. As a result, mapmakers have developed different projections, or ways of showing the earth on a flat piece of paper.

**Goode’s Interrupted Equal-Area Projection**

Take a second look at your peeled, flattened orange. You might have something that looks like a map based on Goode’s Interrupted Equal-Area projection. A map with this projection shows continents close to their true shapes and sizes. This projection is helpful to compare land areas among continents.

**Robinson Projection**

A map using the Robinson projection has minor distortions. Land on the western and eastern sides of the Robinson map appears much as it does on a globe. The areas most distorted on this projection are near the North and South Poles.

**Winkel Tripel Projection**

The Winkel Tripel projection gives a good overall view of the continents’ shapes and sizes. Land areas in a Winkel Tripel projection are not as distorted near the Poles as they are in the Robinson projection.

**Mercator Projection**

The Mercator projection shows true direction and land shapes fairly accurately, but not size or distance. Areas that are located far from the Equator are quite distorted on this projection. Alaska, for example, appears much larger on a Mercator map than it does on a globe.
**Map Key** An important first step in reading a map is to note the map key. The map key explains the lines, symbols, and colors used on a map. For example, the map on this page shows the various climate regions of the United States and the different colors representing them. Cities are usually symbolized by a solid circle (•) and capitals by a star (*). On this map, you can see the capital of Texas and the cities of Los Angeles, Seattle, New Orleans, and Chicago.

**Scale Bar** A measuring line, often called a scale bar, helps you figure distance on the map. The map scale tells you what distance on the earth is represented by the measurement on the scale bar.

**Compass Rose** A map has a symbol that tells you where the cardinal directions—north, south, east, and west—are positioned. This symbol is called a compass rose.
General Purpose Maps

Maps are amazingly useful tools. You can use them to preserve information, to display data, and to make connections between seemingly unrelated things. Geographers use many different types of maps. Maps that show a wide range of general information about an area are called **general purpose maps**. Two of the most common general purpose maps are physical and political maps.

**Physical Maps ▼**

Physical maps call out landforms and water features. The physical map of Sri Lanka below shows rivers and mountains. The colors used on physical maps include brown or green for land, and blue for water. These colors and shadings may show **relief**—or how flat or rugged the land surface is. In addition, physical maps may use colors to show **elevation**—the height of an area above sea level. A key explains what each color and symbol stands for.

**Political Maps ▲**

Political maps show the names and boundaries of countries, the location of cities and other human-made features of a place, and often identify major physical features. The political map of Spain above, for example, shows the boundaries between Spain and other countries. It also shows cities and rivers within Spain and bodies of water surrounding Spain.
Contour Maps ▼

One kind of physical map, called a **contour** map, also shows elevation. A contour map has **contour lines**—one line for each major level of elevation. All the land at the same elevation is connected by a line. These lines usually form circles or ovals—one inside the other. If contour lines come very close together, the surface is steep. If the lines are spread apart, the land is flat or rises very gradually. Compare the contour map of Sri Lanka below to its physical map on page 9.

Special Purpose Maps ▶

Some maps are made to present specific kinds of information. These are called **thematic** or **special purpose maps**. They usually show specific topics in detail. Special purpose maps might present climate, natural resources, or population density. They might also display historical information, such as battle sites or territorial expansions. The map’s title tells what kind of special information it shows. Colors and symbols in the map key are especially important on these types of maps.

One type of special purpose map uses colors to show population density, or the average number of people living in a square mile or square kilometer. As with other maps, it is important to first read the title and the key. The population density map of Egypt above shows that the Nile River valley and delta are very densely populated.
Graphs

A graph is a way of summarizing and presenting information visually. Each part of a graph gives useful information. First read the graph’s title to find out its subject. Then read the labels along the graph’s axes—the vertical line along the left side of the graph and the horizontal line along the bottom. One axis will tell you what is being measured. The other axis tells what units of measurement are being used.

Bar and Line Graphs

Graphs that use bars or wide lines to compare data visually are called bar graphs. Look carefully at the bar graph above, which compares world languages. The vertical axis lists the languages. The horizontal axis measures the number of speakers of the language in millions. By comparing the lengths of the bars, you can quickly tell which language is spoken by the most people. Bar graphs are especially useful for comparing quantities.

A line graph is a useful tool for showing changes over a period of time. The amounts being measured are plotted on the grid above each year, and then are connected by a line. Line graphs sometimes have two or more lines plotted on them. The line graph to your left shows that the number of farms in the United States has decreased since 1940.
Circle Graphs

You can use circle graphs when you want to show how the whole of something is divided into its parts. Because of their shape, circle graphs are often called pie graphs. Each “slice” represents a part or percentage of the whole “pie.” On the circle graph below, the whole circle (100 percent) represents the world’s population in 2002. The slices show how this population is divided among the world’s five largest continents.

Charts

Charts present facts and numbers in an organized way. They arrange data, especially numbers, in rows and columns for easy reference. Look at the chart called “Population Growth” on page 88. To interpret the chart, first read the title. It tells you what information the chart contains. Next, read the labels at the top of each column and on the left side of the chart. They explain what the numbers or data on the chart are measuring.

Pictographs

Like bar and circle graphs, pictographs are good for making comparisons. Pictographs use rows of small pictures or symbols, with each picture or symbol representing an amount. Look at the pictograph showing the number of automobiles produced in the world’s five major automobile-producing countries above. The key tells you that one car symbol stands for 1 million automobiles. The total number of car symbols in a row adds up to the auto production in each selected country.
Climographs

A **climograph**, or climate graph, combines a line graph and a bar graph. It gives an overall picture of the long-term weather patterns in a specific place. Climographs include several kinds of information. The green vertical bars on the climograph of Moscow to your right show average monthly amounts of precipitation (rain, snow, or sleet). These bars are measured against the axis on the right side of the graph. The red line plotted above the bars represents changes in the average monthly temperature. You measure this line against the axis on the left side.

Diagrams

**Diagrams** are drawings that show steps in a process, point out the parts of an object, or explain how something works. An **elevation profile** is a type of diagram that can be helpful when comparing the elevations—or heights—of an area. It shows an exaggerated side view of the land as if it were sliced and you were viewing it from the side. The elevation profile of Africa below clearly shows sea level, low areas, and mountains.
As you read about world cultures and geography, you will encounter the terms listed below. Many of the terms are pictured in the diagram.

**absolute location** exact location of a place on the earth described by global coordinates

**basin** area of land drained by a given river and its branches; area of land surrounded by lands of higher elevation

**bay** part of a large body of water that extends into a shoreline, generally smaller than a gulf

**canyon** deep and narrow valley with steep walls

**cape** point of land that extends into a river, lake, or ocean

**channel** wide strait or waterway between two landmasses that lie close to each other; deep part of a river or other waterway

**cliff** steep, high wall of rock, earth, or ice

**continent** one of the seven large landmasses on the earth

**cultural feature** characteristic that humans have created in a place, such as language, religion, housing, and settlement pattern

**delta** flat, low-lying land built up from soil carried downstream by a river and deposited at its mouth

**divide** stretch of high land that separates river systems

**downstream** direction in which a river or stream flows from its source to its mouth

**elevation** height of land above sea level

**Equator** imaginary line that runs around the earth halfway between the North and South Poles; used as the starting point to measure degrees of north and south latitude

**glacier** large, thick body of slowly moving ice

**gulf** part of a large body of water that extends into a shoreline, generally larger and more deeply indented than a bay

**harbor** a sheltered place along a shoreline where ships can anchor safely

**highland** elevated land area such as a hill, mountain, or plateau

**hill** elevated land with sloping sides and rounded summit; generally smaller than a mountain

**island** land area, smaller than a continent, completely surrounded by water

**isthmus** narrow stretch of land connecting two larger land areas

**lake** a sizable inland body of water

**latitude** distance north or south of the Equator, measured in degrees

**longitude** distance east or west of the Prime Meridian, measured in degrees

**lowland** land, usually level, at a low elevation

**map** drawing of the earth shown on a flat surface

**meridian** one of many lines on the global grid running from the North Pole to the South Pole; used to measure degrees of longitude

**mesa** broad, flat-topped landform with steep sides; smaller than a plateau
**mountain** land with steep sides that rises sharply (1,000 feet [305 m] or more) from surrounding land; generally larger and more rugged than a hill

**mountain peak** pointed top of a mountain

**mountain range** a series of connected mountains

**mouth** (of a river) place where a stream or river flows into a larger body of water

**ocean** one of the four major bodies of salt water that surround the continents

**ocean current** stream of either cold or warm water that moves in a definite direction through an ocean

**parallel** one of many lines on the global grid that circle the earth north or south of the Equator; used to measure degrees of latitude

**peninsula** body of land jutting into a lake or ocean, surrounded on three sides by water

**physical feature** characteristic of a place occurring naturally, such as a landform, body of water, climate pattern, or resource

**plain** area of level land, usually at a low elevation and often covered with grasses

**plateau** area of flat or rolling land at a high elevation, about 300–3,000 feet (91–914 m) high

**Prime Meridian** line of the global grid running from the North Pole to the South Pole through Greenwich, England; starting point for measuring degrees of east and west longitude

**relief** changes in elevation over a given area of land

**river** large natural stream of water that runs through the land

**sea** large body of water completely or partly surrounded by land

**seacoast** land lying next to a sea or ocean

**sea level** position on land level with the surface of a nearby ocean or sea

**sound** body of water between a coastline and one or more islands off the coast

**source** (of a river) place where a river or stream begins, often in highlands

**strait** narrow stretch of water joining two larger bodies of water

**tributary** small river or stream that flows into a larger river or stream; a branch of the river

**upstream** direction opposite the flow of a river; toward the source of a river or stream

**valley** area of low land between hills or mountains

**volcano** mountain created as liquid rock or ash erupts from inside the earth