

*Map
and
Globe
Handbook*

Geography Introduction

Map and Globe Handbook

You are about to begin an exciting journey across the centuries. In this handbook, you'll explore roads built by the Inca almost 500 years ago, learn how people built dikes and dams to reclaim land in the Netherlands, and travel to a mountaintop in Indonesia. In addition, you'll visit empires that existed almost 4,000 years ago, and learn about the battle that ended the American Revolution.

Since all journeys require maps, your adventure starts right here. This handbook will help you unlock the secrets of maps and globes. Turn to page G1, and let your journey begin.

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Understanding Our Planet

A map is a representation of a part of the earth drawn on a flat surface. Study the satellite image and the map below. The image shows what South America looks like from miles above the earth. Mapmakers sometimes use these images to help draw maps. Now look at the map of roads that the Inca built almost 500 years ago in the Andes of South America. Notice how the shape of the coastline in the image matches the shape of the map. The locator map in the top right-hand corner helps you find where this region is located on earth.



▲ Satellites collect information in space and send it back to earth. The information can then be turned into images that look like photographs. The colors on this satellite image show different geographical features of South America.

► This map shows the roads that the Inca built almost 500 years ago. Look at the size of the empire. How do you think having a systems of roads helped strengthen the Inca Empire?

Understanding a Map

Take a few minutes to look quickly at the maps in this handbook. You'll notice that there are maps of different sizes, featuring different places. Most of the maps show a portion of the world, and a few represent the entire world. Depending on the type of map, you can find out about a place's climate, population density, migration patterns, elevation, time zones, or people.

All maps share certain characteristics. Every part of a map contains important information. To understand the whole map, you need to know how to read each part of it. Look at the map below. It shows the continent of Australia.

The **compass rose** points out directions. The tips of this compass rose point to north (**N**), south (**S**), east (**E**), and west (**W**), as well as intermediate, or in-between, directions.

An **inset** is related to the larger map. This inset map is a **locator inset**, which helps you to find what part of the earth is shown on the larger map.

Latitude and **longitude** are imaginary lines that form a **grid** over the earth. A grid is a pattern of lines that cross one another. You can use the grid to locate places on the map.



The **scale line** shows how much smaller the map is than the actual area it represents.

The **legend**, or **key**, explains what the symbols on the map mean. This legend identifies state, territorial, and national capitals.

Using the Legend and Grid

Maps can help you make connections between different events and cultures. The map below shows four different civilizations that settled in or near the eastern Mediterranean in the 600s B.C. By seeing how close some of these cultures were to each other, you can begin to think about the influences they may have had on each other.

A grid helps you to locate places on the map. Look up Corsica in the map's index, and read the letter and number beside the name, A1. Find the letter A on the map, and then find the number 1. Is Corsica located within the square formed by the grid lines?

The Eastern Mediterranean in the 600s B.C.



The legend uses different colors to indicate where people were settled in the eastern Mediterranean during the 600s B.C. In Corsica, Etruscan settlements surrounded Greek settlements.

MAP SKILLS

- REVIEW** In which grid square is the island of Crete located? Who lived in Crete in the 600s B.C.?
- REVIEW** Name at least two cities in grid C5.
- THINK ABOUT IT** What appears to be the significance of major rivers and coastlines on the map?
- TRY IT** Add four more cities to the map index.

Understanding Hemispheres, Latitude, and Longitude



Northern Hemisphere



Southern Hemisphere



Western Hemisphere



Eastern Hemisphere

When you study a map or a globe, you'll see a grid of lines composed of latitude and longitude. These imaginary lines are used to locate places on a map or globe. This imaginary grid of lines also helps to divide the earth into four hemispheres—northern, southern, western, and eastern. The word hemisphere is from Greek and translates as “half a sphere.”



Longitude is the number of degrees east or west of the prime meridian. Lines of longitude meet at the North and the South Poles.

The **Equator** is 0° latitude. It separates the Northern and Southern Hemispheres.

The **prime meridian** is 0° longitude and goes through Greenwich, England. The prime meridian and the longitude line opposite it at 180° separate the earth into the Eastern and Western Hemispheres.

Lines of **latitude** run east and west across the globe. Latitude is the number of degrees north or south of the equator. Lines of latitude never meet.

MAP SKILLS

1. **REVIEW** In which two hemispheres would you find the United States?
2. **REVIEW** What is the approximate latitude and longitude for Cairo, Egypt and Rio De Janeiro, Brazil?
3. **THINK ABOUT IT** Why do you need both the latitude and longitude to locate a place on a map? What would happen if you only had one of the measurements?
4. **TRY IT** Look at the map of China on page 193. At what latitude and longitude is Chengdu located?

Drawing Inferences from Maps

You know from reading that authors don't always spell out every detail. As a reader, you have to rely on your own experience and clues in the text to figure out information about a plot. When you do this, you're making inferences.

You can also make inferences from maps. A map's scale, legend, and details will give you clues. This map shows the canals, dams, and waterways of the Netherlands today. How do you think these natural and human-made features have affected people's lives?



Look at the location of Amsterdam, the capital of the Netherlands. From the map, what can you infer about how this city's location affects its residents?

These yellow areas were once under water, but have been reclaimed. That means that people pumped the water out of this part of the bay and now use the land for farms, homes, or other uses.

The legend shows the many dams and canals in this small country. Look at the location of the dams and canals on the map.

MAP SKILLS

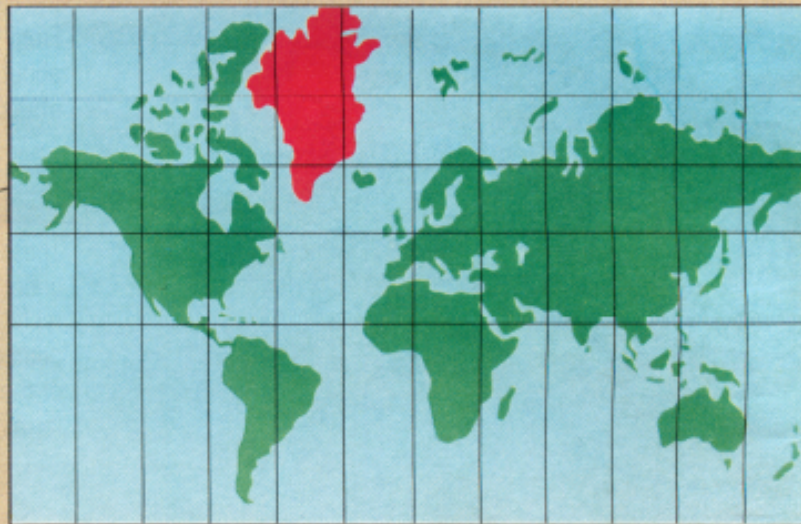
- REVIEW** Look at the location of Rotterdam. What can you infer about the kinds of jobs that people in Rotterdam might have?
- THINK ABOUT IT** What natural disasters do you think people in the Netherlands worry about? Why?
- TRY IT** Look at northern South America on the map of world climates on page 530. Based on its climate pattern, what can you infer about land use there? Now look at the world land use map on page 531 to see if you were correct. Try this for other regions of the world.

Understanding Projections

Suppose you have a map of the world and a sphere. You want to cover the sphere with the map to make a globe. Since the map is flat and the sphere is round, you won't ever have a perfect fit. Cartographers still wrestle with the problem of representing the round earth on a flat map. They use projections, or ways of transferring the curved surface of the earth onto a flat map. All projections have some distortion of distance, direction, size, or shape.

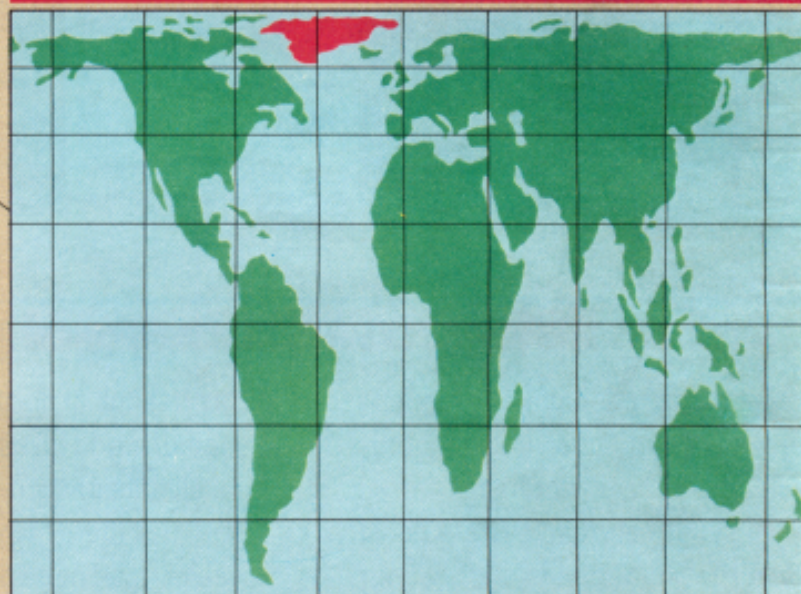
In 1569 the German cartographer (mapmaker) Gerhardus Mercator first published this projection. A Mercator Projection maintains the shapes of the continents but distorts their sizes, especially near the poles. Look at the size of Greenland on this projection. In reality, it's about the same size as Mexico!

WORLD: Mercator Projection

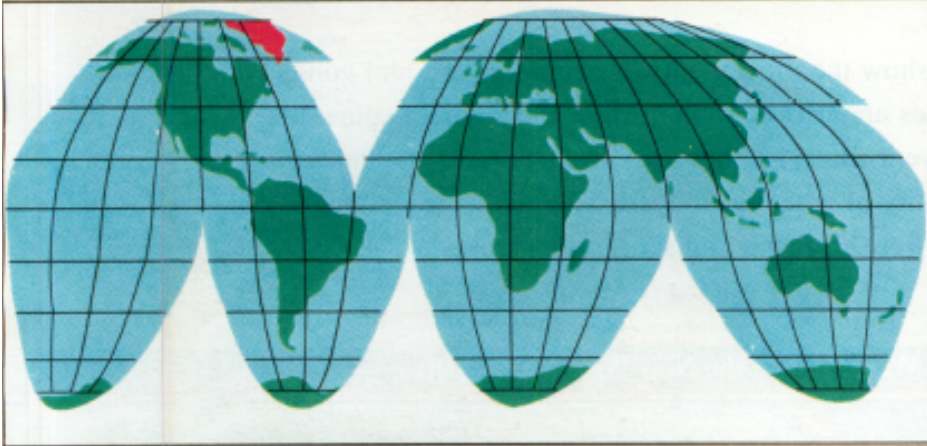


In 1974, Arno Peters, a West German cartographer, created the Peters Projection. The sizes of the continents in relation to each other are accurate, but their shapes are distorted. Look at South America on the Peters Projection map. How does its size and shape compare to that of South America on the Mercator Projection?

WORLD: Peters Projection



WORLD: Goode Projection



Paul Goode, a cartographer from the University of Chicago, combined elements of two other projections to create the Goode Projection in 1923. Notice how the projection divides the world into sections. These divisions help make the projection of continents more accurate in terms of size and shape, but distances are difficult to measure.

WORLD: Robinson Projection



In 1963, American cartographer Arthur Robinson created this projection. The Robinson Projection shows the sizes, shapes, and distances between the continents fairly accurately. Most of the world maps in this book use the Robinson Projection as their base.

MAP SKILLS

- 1. REVIEW** On which projection does Africa look the largest? On which projection does it look the smallest?
- 2. REVIEW** Which projection would you use to find out the correct size of Greenland? the shortest route between South America and Australia? the shape of Antarctica? the shape of Africa?
- 3. THINK ABOUT IT** Look at South America on the Goode and on the Mercator Projections. Why do they look similar while Greenland and other areas near the poles look so different? Use a globe to answer the question.
- 4. TRY IT** Choose a map in this book. Which projection does it use? Explain the advantages of using that particular projection.

Interpreting Flow Lines

Maps can show the movements of people, ideas, and goods by using flow lines. Flow lines are arrows on maps that show where something came from and where it went. Because they vary in thickness, graduated flow lines also show the quantity of what has moved. The map below shows the number of Africans who were enslaved and sent to the Americas.



The legend shows how the thickness of the arrows relates to the number of Africans who were sent to the Americas.

Graduated flow lines let you compare amounts quickly. Based on the map, were more Africans sent to Central America or the West Indies?

MAP SKILLS

- 1. REVIEW** About how many Africans were sent to Brazil as slaves?
- 2. REVIEW** Name the four places on the map where Africans were sent. Rank them from where the most Africans went to where the fewest went.
- 3. THINK ABOUT IT** What else might you show with flow lines on a map?
- 4. TRY IT** Make or obtain a map of your community. Use arrows to mark the flow of your class members as you travel from school to home.

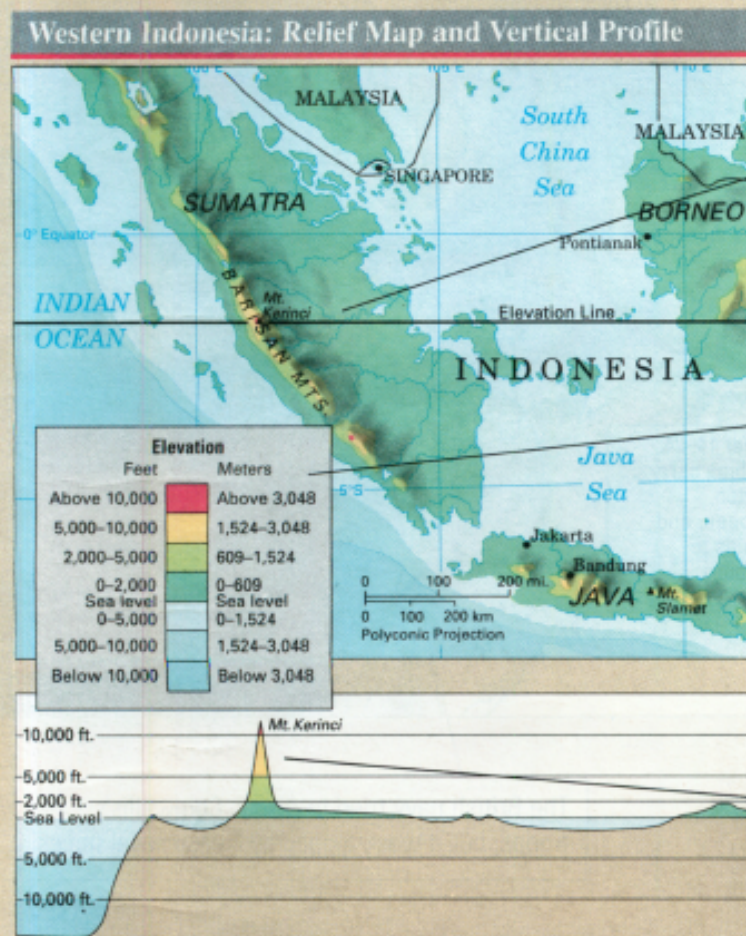
Reading Different Kinds of Maps

As you've already seen, maps can show more than the shape of land. They can show details about historical places; how people have changed their land; and the flow of people, goods, or ideas. In this section, you'll learn to use several different kinds of maps.

A Relief Map with a Vertical Profile

A relief map shows the topography, which means the natural surface features of the land. It does this by showing the land's elevation, or height above sea level. A vertical profile is a diagram on a physical map that presents a side view of an elevation line (also called a profile line) drawn across the map. This map shows the topography of the island of Sumatra, in Indonesia, along an elevation line.

What jobs might use a topo. map?



Notice how the colors of the map are related to elevation. What is the elevation of most of the land in Sumatra?

Different colors represent the elevation of the land on the map and in the profile. Elevation on this map ranges from over 10,000 feet below sea level to over 10,000 feet above sea level.

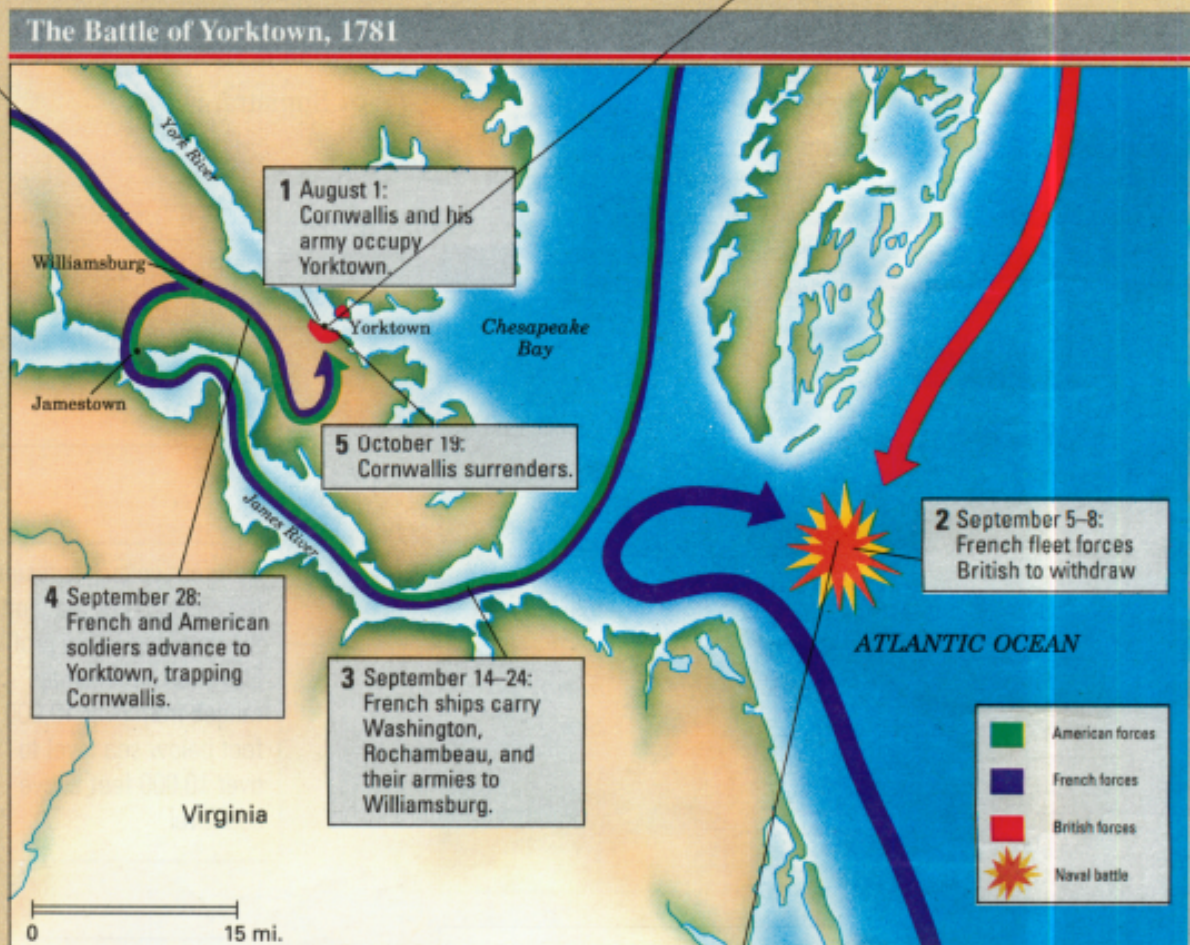
The profile clearly indicates the rise and fall of the land in Sumatra along the elevation line. Mt. Kerinci rises to more than 10,000 feet.

A Battle Map

A battle map illustrates the events of a particular battle or series of battles. Since the outcome of a battle is often affected by the land on which it occurs, maps are a good way to show battles. The map below uses symbols to show the positions and movements of troops during the Battle of Yorktown that took place during the American Revolution.

The green arrows stand for American troops, the red arrow and shapes stand for British troops, and the blue arrows stand for French forces. The direction of the arrows shows the movement of the forces.

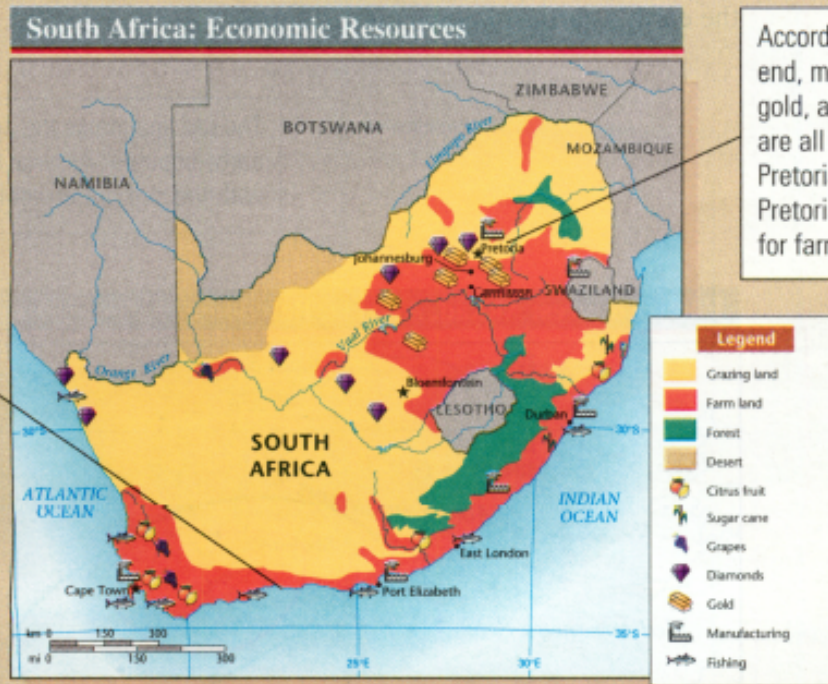
The map shows that Cornwallis's British troops became trapped at Yorktown, because it was on a peninsula. Once Washington's American troops and Rochambeau's French troops moved in, the British troops had nowhere to go to escape. Cornwallis was forced to surrender.



The British navy tried to rescue Cornwallis's troops, but it was stopped by French naval forces.

Comparing Maps

Maps can contain many different kinds of information. Look at the two maps of South Africa below. The top map shows the economic resources of the country and the bottom map shows its population. By comparing the two maps, you can learn how economic use and population are related in South Africa.



There are fewer economic resources along the coast of South Africa between Cape Town and Port Elizabeth. What are they?

According to the legend, manufacturing, gold, and diamonds are all located near Pretoria. The land near Pretoria is also good for farming.



What is the population of the coast between Cape Town and Port Elizabeth? Based on these two maps, what conclusions can you draw about a region's economic resources and its population?

The many red dots near Pretoria show that the city and the region around it are densely populated.

A Historical Map and a Timeline

Many of the maps in this handbook are historical maps. Cartographers today can draw historical maps based on historical records and writings and archaeological discoveries. This historical map shows three empires that existed in the part of the world known as Mesopotamia between 2350 and 1750 B.C. The two rivers in this region, the Tigris River and the Euphrates River, were important for some of the earth's earliest known civilizations.

The red line marks the approximate boundaries of the early empire of Assyria. How did its size compare with the size of Babylonia?



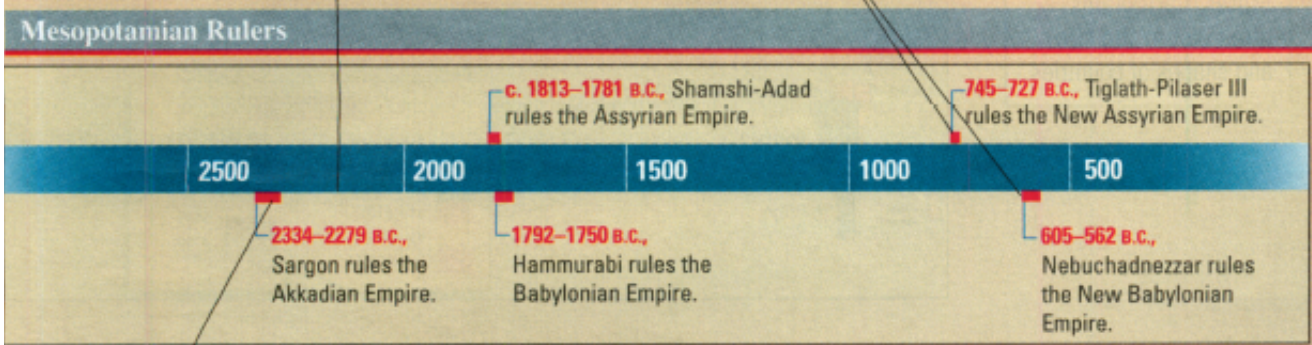
The legend shows the colors that represent each empire as well as the time period in which the empires existed.

You can see that the Tigris River flowed through all three empires. Why do you think empires developed near rivers?

Timelines record events that occurred in the past. They present the events in order so you can see and understand the sequence of different events. This timeline gives a sequence of some events that occurred in the Akkadian, Assyrian, and Babylonian empires shown on the map on page G12. It also shows some other events that occurred in this region.

The timeline is broken into intervals of 500 years. The numbers on this timeline decrease as you move to the right, because the dates are b.c., which stands for Before Christ. This means the dates refer to the number of years before Jesus was born, so the numbers decrease as you move closer to Jesus' birth. After Jesus' birth the numbers increase.

The timeline identifies two rulers whose empires were not shown on the map. Based on the information here, can you add those empires to the map? Why or why not?



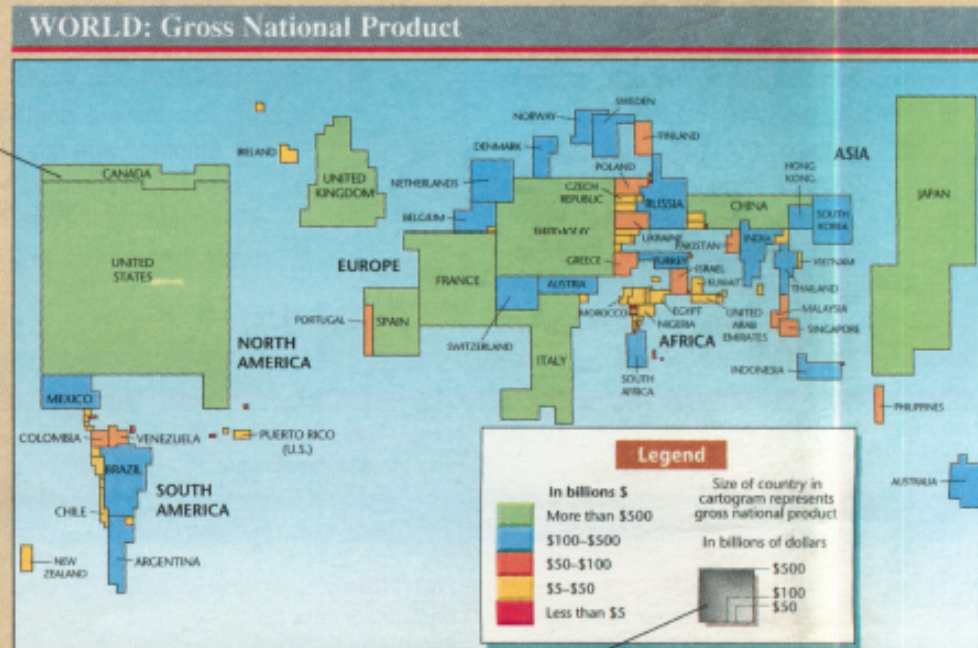
This area of the timeline shows the reign of Sargon, who created the world's first empire, Akkad. How long did Sargon rule Akkad?

How is the information that you learn from the map on the left page similar to the information on this timeline? How is the information different?

A Cartogram

You already know that maps can show physical features, like land and water. But they can also show statistics, almost like a graph. These kinds of maps are called cartograms. Cartograms look very different from physical maps. The cartogram below shows the gross national product (GNP) for all countries of the world. The GNP is the total value of all the goods and services produced by a country in a single year.

On a physical map, Canada would appear larger than the United States. On this cartogram, it is much smaller. That means that Canada's GNP is considerably smaller than that of the United States. Cartograms often distort the size and shapes of countries.



Like physical or political maps, cartograms have scales or legends. Scales on cartograms, however, don't measure distance. This scale explains that the size of each country reflects the size of its gross national product.

MAP SKILLS

- 1. REVIEW** How did the geography of the land help defeat the British in the Battle of Yorktown?
- 2. REVIEW** Which ruler in Mesopotamia controlled the city of Ur and ruled until 1750 B.C.?
- 3. REVIEW** Name three countries whose GNPs are equal to or larger than France's.
- 4. THINK ABOUT IT** How would changing the elevation line on the map on page G9 change the profile you see?
- 5. TRY IT** Compare two different types of maps of your state. Make a table to compare what the maps tell you about your state.

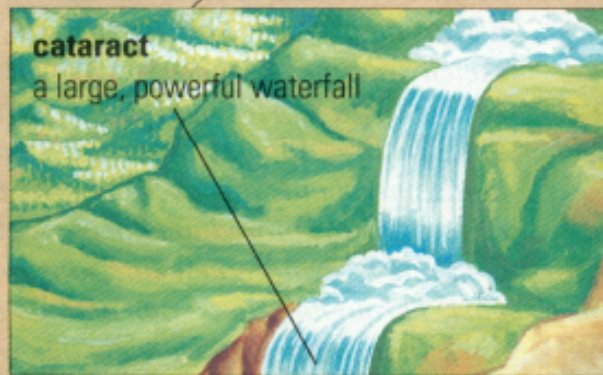
Using Geographic References

What is a cataract? Where is Flanders located? Which languages are spoken in Africa? The Time/Space Databank on pages 503–548 will help you answer these and other geography questions.

The **Atlas**, pages 518–533, includes many types of maps, such as physical, political, historical, climate, land use, and resources. The map on page 529 shows where specific languages are spoken. This portion of the map shows Africa. African, Semitic, Malayo-Polynesian, and Indo-European languages are all spoken in Africa.



The **Glossary of Geographic Terms**, pages 534–535, illustrates and defines key geographic terms, such as cataract. From the description, you can tell that Niagara Falls is a major cataract.



F				
ernando Póo (island off W. Africa)	4°N	9°E	465	
landers (region noted for woolen trade; France, Belgium)	51°N	3°E	330	
lorence (cultural center of Renaissance Italy)	44°N	11°E	317	
ostat (Cairo; capital of Fatamid caliphate; Egypt)	30°N	31°E	80	

The **Gazetteer**, pages 536–537, lists locations, accompanied by brief descriptions, latitude and longitude, and where to find that location in this book. Flanders is a region in Europe. It is at 51° North, and 3° East, and is shown on a map on page 330.

MAP SKILLS

REVIEW You want to find the location of the Great Rift Valley. In which part of the Time/Space Databank would you look?

THINK ABOUT IT What is the relationship between a savanna, a sahel, and a desert?

Where would you look in the Time/Space Databank to find the answer?

- TRY IT** Choose any two terms from the Glossary of Geographic Terms. Find examples of these features in the Atlas.