Chapter 2

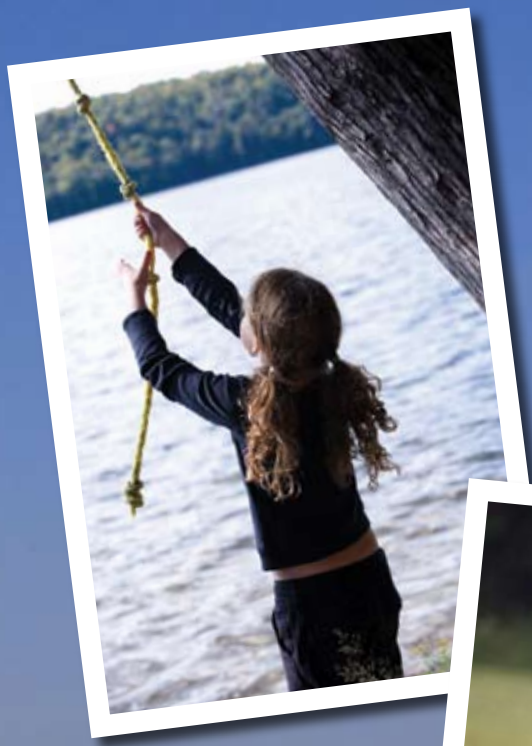
An Introduction to Geography

Geography is one of the oldest sciences, beginning when our earliest ancestors first asked, "What is on the other side of that hill?" Geography is sometimes called "the mother of all sciences" because, when our early ancestors crossed over that hill, they found different animals, different weather, different land features, different rocks, and even different people. When they started comparing them to what they had back home, they were using such sciences as biology, meteorology, geology, and sociology.

Geography is the exploration and discovery of new places, new cultures, and new ideas. There are two types of basic geography:

- *Cultural geography* studies human beings and their impact on Earth. It looks at languages, religions, foods, architecture, agriculture, transportation, cities and small towns, politics, and economics.
- *Physical geography* is the study of Earth's natural features—its water, air, animals, mountains, rivers and lakes, and atmosphere.

When we combine cultural geography with physical geography to study one particular place, like the state of Missouri, it is called *regional geography*.



This Page, Top: Young girl enjoying a rope swing at a lake. **Middle:** This mother and son are walking through a Missouri meadow. **Bottom:** Raccoons are found all across Missouri.

Missouri Close Up

Missouri Numbers

Number of bordering states: 8

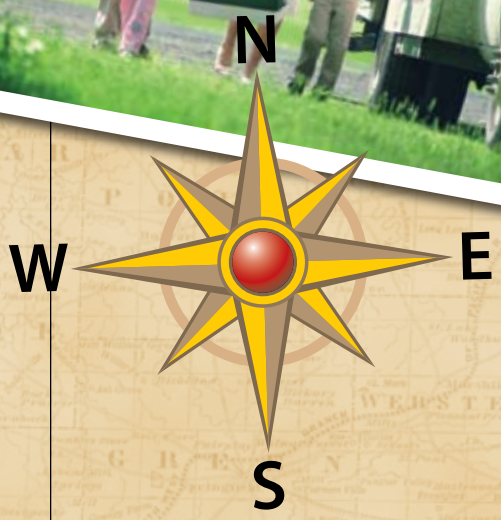
Number of counties: 114

Number of state parks: 49

Number of state historic sites: 34

Number of natural areas: 168

Percentage of land in state conservation areas: 2



Missouri Geography

Length of borders in miles:

West: 318

South: 322

East: 439

North: 233

Land area in square miles: 68,898

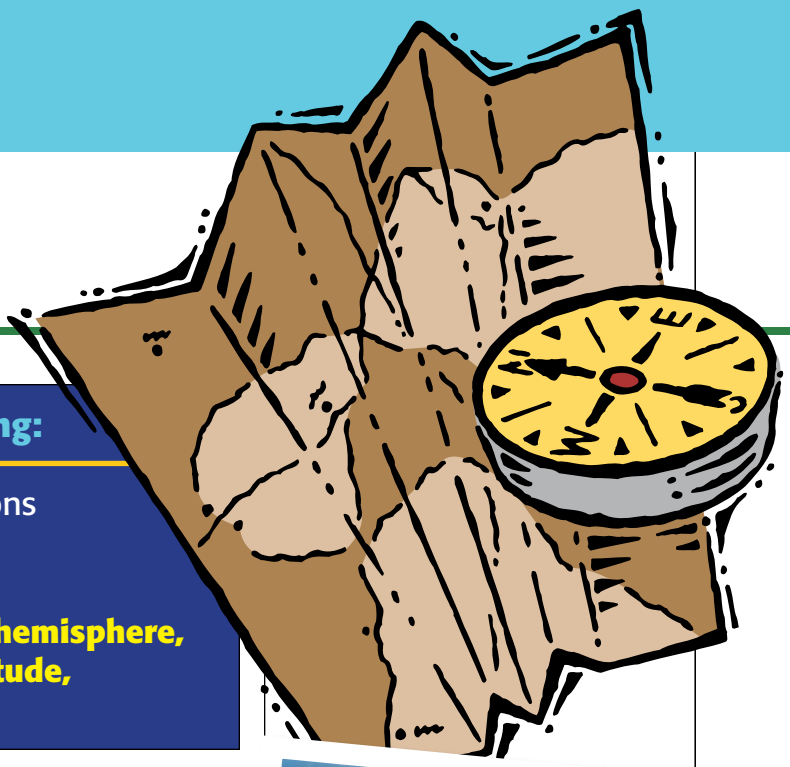
Water area in square miles: 811

Highest elevation: 1,772 feet above sea level (Taum Sauk Mountain in Iron County)

Lowest elevation: 230 feet above sea level (St. Francis River in southwest Dunklin County)

Section 1

Maps

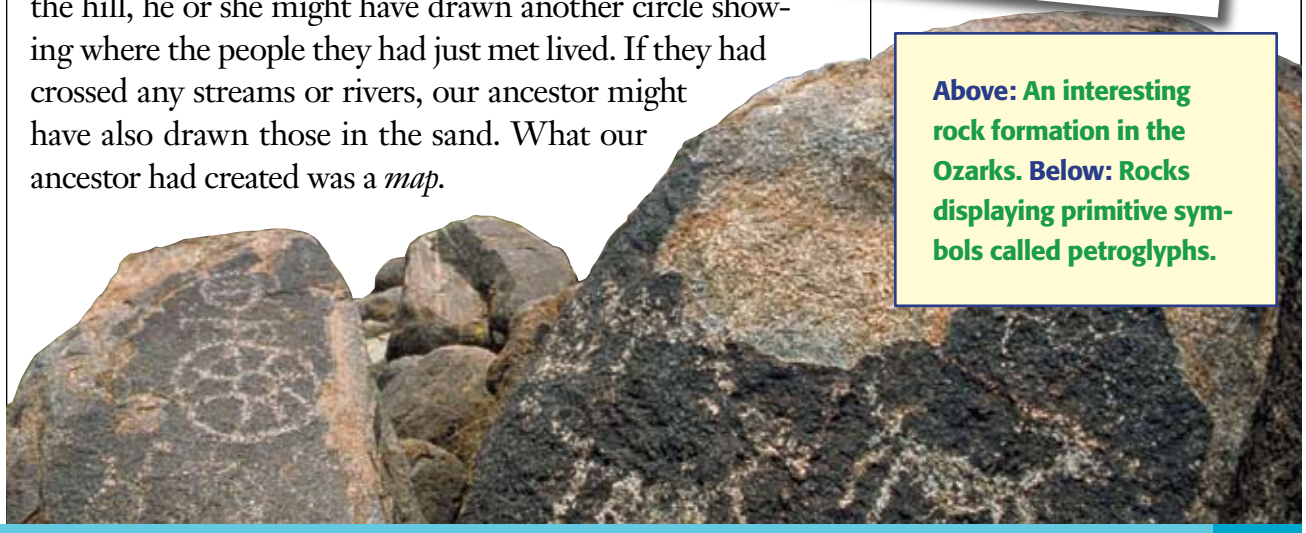


As you read, look for the following:

- how the globe is divided into sections
- the names of these sections
- the names of the lines on a map
- vocabulary terms **prime meridian, hemisphere, equator, continent, latitude, longitude, navigation, elevation, atlas**

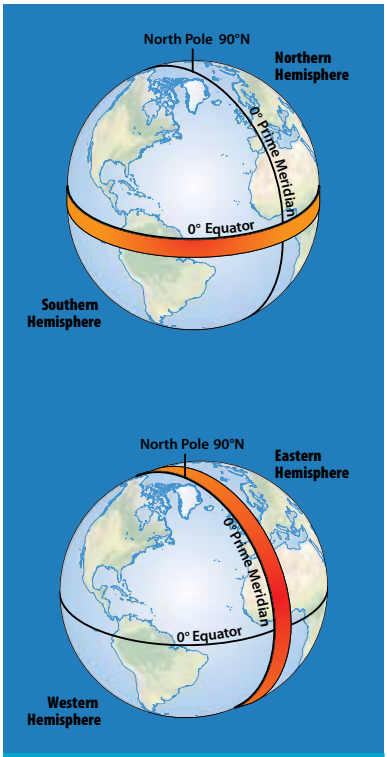
When our earliest ancestors became curious enough to cross over the hill and met different people, those people probably asked, "Where are you from?" What if someone asked you that question? Could you tell them where Missouri is? Geography uses various tools to help us tell people where a place is and what it is like.

When our earliest ancestors were trying to tell people where they came from, one of them might have taken a stick and drawn pictures in the sand showing the hill. On one side of the hill, he or she might have made a circle representing the village where our ancestors lived. On the other side of the hill, he or she might have drawn another circle showing where the people they had just met lived. If they had crossed any streams or rivers, our ancestor might have also drawn those in the sand. What our ancestor had created was a *map*.



Above: An interesting rock formation in the Ozarks. Below: Rocks displaying primitive symbols called petroglyphs.

Top, Right: Earth as seen from outer space.
Bottom, Right: A teacher and student are checking out a globe.



Map 1
The Hemispheres

Map Skill: Is the United States in the Western Hemisphere or the Eastern Hemisphere?

Finding Our Place

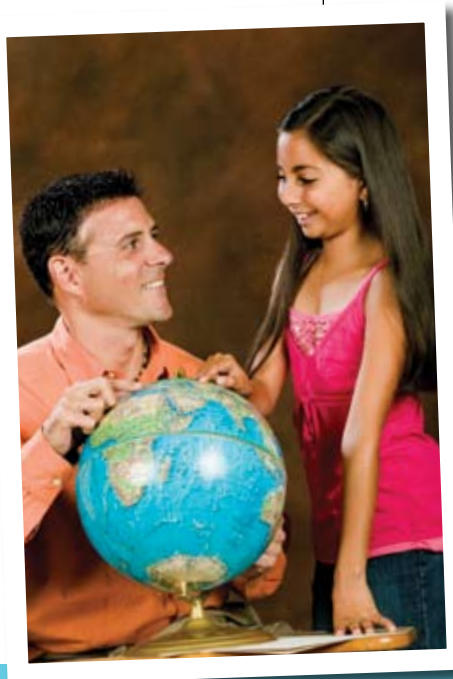
If we were to travel into space and look back at Earth, we would see that it is shaped like a ball. This ball is spinning on an *axis*, an imaginary line that runs from top to bottom through the middle. At the north end of the axis is the North Pole. The South Pole is at the south end of the axis.

There are also two imaginary lines on opposite sides of the ball that run from pole to pole. On a map, one of these lines is called the **prime meridian**. The English were the first to draw the prime meridian on maps, so the line runs through the city of Greenwich (pronounced "Gren-itch") in England and through western Africa and Antarctica. On the other side of the ball, the line is called the "180th meridian." It runs through the Aleutian Islands of Alaska, eastern Russia, the islands of Micronesia, New Guinea, eastern Australia, New Zealand, and Antarctica. The prime meridian and the 180th meridian divide Earth into two halves, or **hemispheres**. One half is the *Western Hemisphere* and the other half is the *Eastern Hemisphere*.

Another line can also be drawn around the middle of Earth halfway between the North and South Poles. This line is called the **equator**, and it divides Earth into the *Northern Hemisphere* and the *Southern Hemisphere*.

Missouri is north of the equator, so it is in the Northern Hemisphere. It is also west of the prime meridian, so it is in the Western Hemisphere.

From outer space, you can see that Earth's surface is mostly water. You can also see landmasses. Geography is mostly interested in the landmasses. The landmasses are divided into **continents**. There are seven continents: Africa, Antarctica, Asia, Australia, Europe, North America, and South America. North America is made up of several countries, including the United States. The United States is made up of 50 states, and Missouri is one of those 50 states.

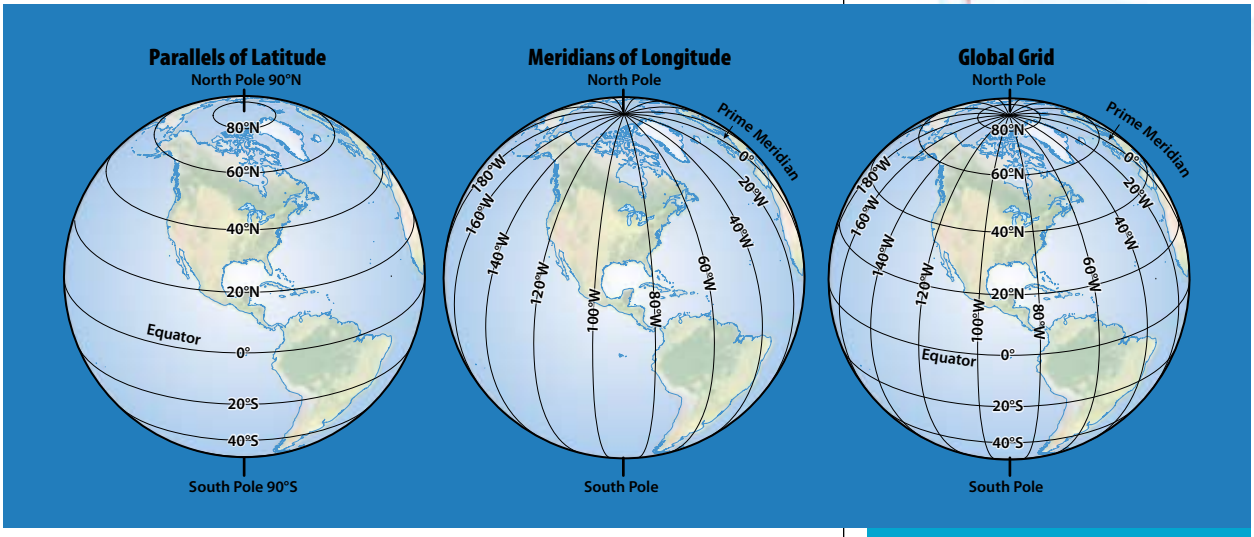


Did you Know?

Sphere is another word for ball, and hemisphere means "half a sphere."

Latitude and Longitude

Look at Map 2, which shows Earth as three balls. The map at the left has one set of parallel lines running from side to side. The lines that run from side to side (east-west) are called lines of **latitude**, or parallels. The map in the middle has another set of lines running from top to bottom. The lines that run from top to bottom (north-south) are called lines of **longitude**, or meridians. The map at the right puts the first two maps together into what is called the *global grid*.



Map 2

The Global Grid

Map Skill: On the map, which line of latitude goes through the United States?

We measure the outside of circles or globes like Earth in *degrees*. A full circle has 360 degrees, and a half circle has 180 degrees. Each degree is divided into 60 *minutes*, and each minute is divided into 60 *seconds*.

Remember that Earth is divided into hemispheres, or half-circles. On a map, the prime meridian (the line that runs through Greenwich, England) is called 0 degrees of longitude. As you go west from Greenwich, the meridian numbers grow larger until you reach 180 degrees on the opposite side of the world. Then they grow smaller until they again reach 0 degrees at the prime meridian.

The lines of latitude are numbered in a slightly different way. The equator is at 0 degrees of latitude. As you go north toward the pole, the numbers grow larger until you reach 90 degrees. The North Pole then is at 90 degrees *north* (or N) latitude. If you go south from the equator, the numbers again grow larger until you reach the pole. The South Pole is at 90 degrees *south* (or S) latitude.

Did you Know?

Every degree of latitude is about 69 miles apart.

This global grid of latitudes and longitudes is how pilots in airplanes, ship captains, and other travelers find their way on a map. It is also how a *global positioning system*, or GPS, tells you where you are. The GPS tells you your latitude and longitude. Your family car might have one. Your home computer probably has one. Hikers and campers use handheld GPS devices so they won't get lost. Using the GPS or another source for latitude and longitude, you can look on a map and find where these coordinates meet and see where you are. For example, Jefferson City, the state capital, is at about longitude 92 degrees and 11 minutes (another way to write this is 92° 11') west and latitude 38 degrees and 34 minutes (38° 34') north.

Map 3

Missouri's Latitude and Longitude

Map Skill: What city is located at approximately latitude 37 degrees 13 minutes and longitude 93 degrees 18 minutes?

Above: An example of a handheld GPS device. Opposite Page: On a physical map, rivers and lakes are usually shown in blue.

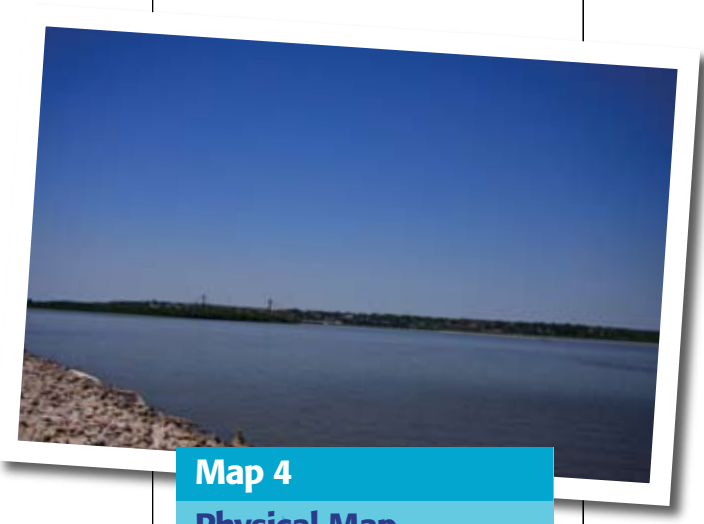
Using a map to find your way or to find out where you are is called **navigation**. People who do this on airplanes or ships are called *navigators*. Another important tool used by navigators is a *compass*. A compass has a dial in the shape of a circle with the four directions — east, west, south, and north — marked on that dial. At the center of the dial is a needle that can spin in a circle. One end of the needle is marked with color or an arrow.

That end of the needle always points toward the magnetic North Pole. Using the compass, a navigator or hiker can always know which way is north.

More Maps and Map-Reading Tools

Take some time and look through this book. You will find many kinds of maps. One shows the geographical regions and features of Missouri. Another shows counties and cities and towns. Still another shows the location of important Civil War battles in Missouri.

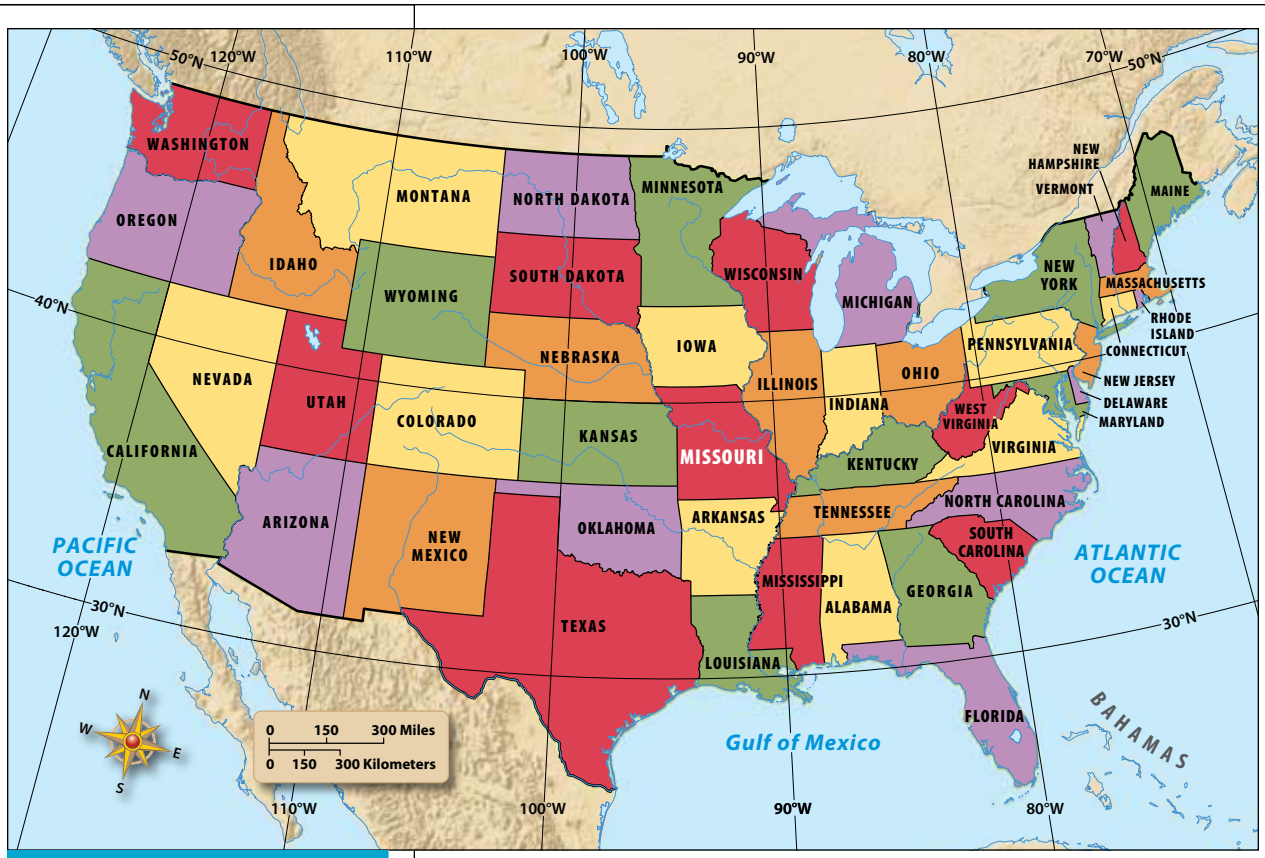
What do you notice about these maps? They all use colors, symbols, and lines. Remember we said the rivers, mountains, lakes, and coasts were physical features. On a map, these are usually shown using lines, shapes, and colors. What color is often used to show water? Dots, circles, and stars are used to show cities and towns. Lines show the borders of countries or states. We call these political features. A map may be a *physical map* or a *political map* or a combination of both. Map 4 is a combination since it shows state outlines.



Map 4

Physical Map

Map Skill: What physical features appear on this map?



Map 5
Political Map

Map Skill: Which two states are not shown on this map? Why not?

Two other features found on most maps are a scale and the compass rose. *Scale* shows the measure of distance used on the map. Knowing the scale will help you measure the distance between two places on a map. The *compass rose* is a simple arrow or more fancy artwork showing the four points of the compass. On most maps, the arrow points toward the north on the map. Locate the scale and the compass rose on Maps 4 and 5. Some maps also contain a legend. The *legend* is a list of the symbols used on the map that tells you what each represents.

Hikers and campers often use *topographic maps*. Look at the topographic map in Map 6. Notice the wavy lines that sometimes form circles. The lines may be close to each other or far apart. Some of the lines are labeled with numbers. These lines show the elevation of the land. **Elevation** is the height of the land. On a

Figure 2
Map Scale

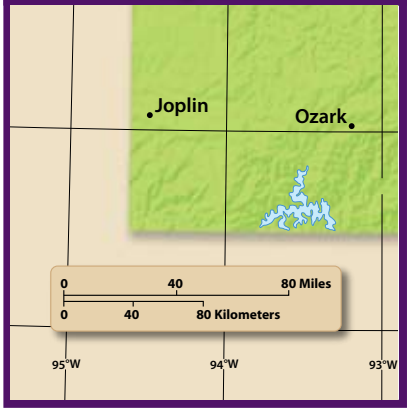
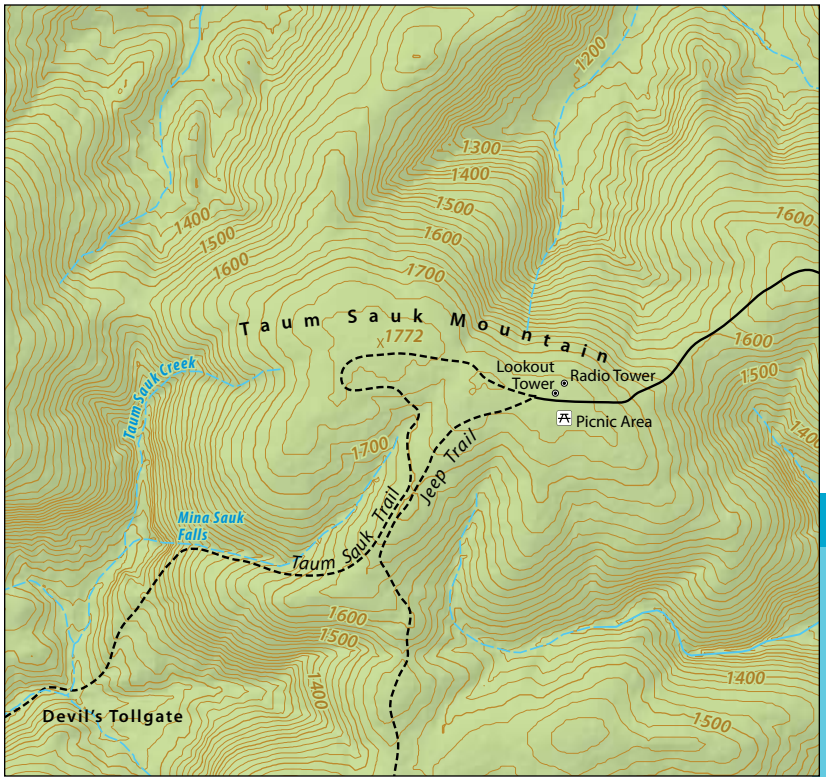


Figure 3
Compass Rose

topographical map, the elevation is measured in feet (or meters) above sea level, with sea level being zero. The lines also tell the map reader how steep a hill or cliff or mountain slope is. The closer the lines are on the map, the steeper the hill. Topographical maps also have symbols for physical features such as springs, caves, and hiking trails that are not usually found on other maps. Manmade features that would help the user figure out where he or she is may also be shown. For example, a tall radio tower might be marked on the map because it can be seen from long distances by hikers.

Above: The Taum Sauk Mountain area is well known for its scenic highways.



Map 6

Topographical Map

Map Skill: What human-made features appear on the map?

There are other types of maps that serve special purposes. City planners might use a *zoning map*. This map shows the different pieces of property and whether they can be used for houses, businesses, factories, or parks. There are also maps that show where natural resources like coal, gas, and water might be found. Not all maps cover landmasses. Maps used to navigate oceans, lakes, or rivers are called *nautical maps* or charts. These might show the depth of the water or where underwater hazards might be found.

Top: This family is looking at a map for a theme park. Right: This teacher is referring to a page in an atlas.

Anyone can draw a simple map, even you. Good maps such as highway maps, topographical maps, and nautical charts are made by professionals called *cartographers*. The art or science of mapmaking is called *cartography*.

You can buy maps of almost any place on Earth showing the whole world or just one tiny place. Sometimes it is necessary to have maps of more than one place or different types of maps of one place. These maps are sometimes gathered into one book called an **atlas**. An atlas of Missouri maps appears in the back of this book.

Do You Remember?

1. Look at a map of the world and select a hemisphere. Is most of the hemisphere you selected covered by water or by land?
2. What is the zero degree of latitude called?

Spotlight

National Geospatial-Intelligence Agency

We can buy maps at almost any store, at service stations, travel agencies, bookstores, or on the Internet. Many companies make maps. But the largest mapmaker, or cartographer, in the world is the U.S. government.

Some of the first maps made for the government were those drawn by Lewis and Clark on their Voyage of Discovery in 1804-1806. As the United States became more involved in world events, including two world wars, the need for accurate maps for the military became more important. In 1943, the Army Air Corps (now the Air Force) created its Aeronautical Chart Plant in St. Louis.

The plant became the largest and most important government mapmaker. It gathered information and created maps for all types of government use, from planning national forests to finding the best location to launch rockets for the space program. Most of the maps were used by the military. As a result, the plant's name was changed to the Defense Mapping Agency in 1972. There were other name changes. In 2004, it was renamed the National Geospatial-Intelligence Agency (NGIA).

The NGIA uses historic maps, information gathered on the ground, photos taken from aircraft, photos taken from satellites far above Earth, and even radar pictures taken by the space shuttles to create the most accurate maps possible. It makes maps of nearly every spot on Earth and especially where American soldiers and sailors are fighting. For Operation Desert Storm in 1991, the agency created 66 million individual maps. It has created even more maps for troops in Iraq and Afghanistan.

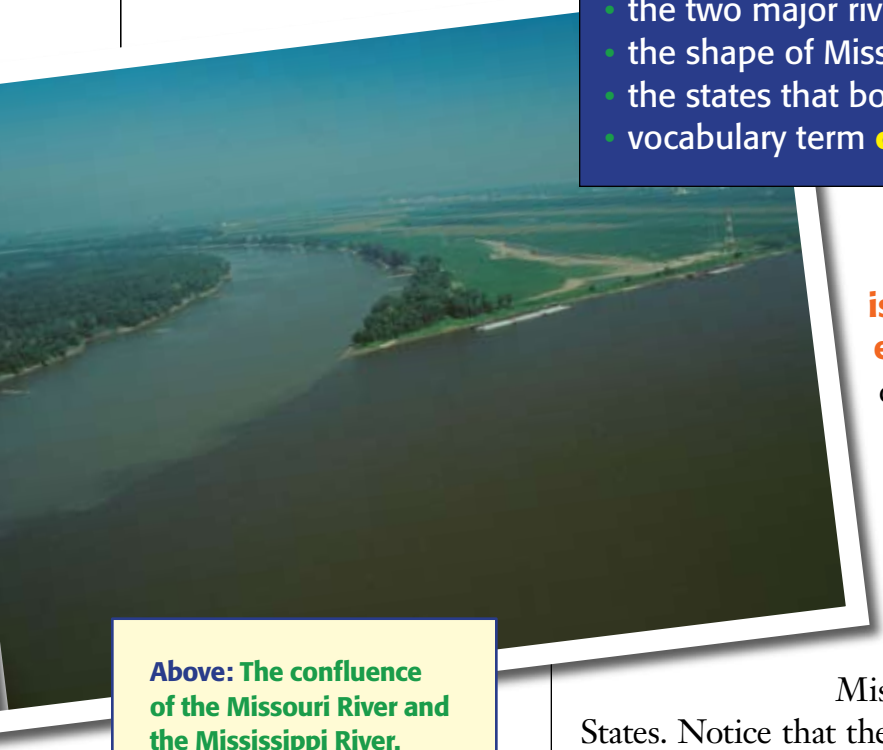
The military isn't the only user of the NGIA maps and geographical information. In 2002, the agency helped planners for the Winter Olympics in Salt Lake City, Utah. In fact, many of the maps you buy in stores or download from the Web are made using information gathered by the NGIA in St. Louis.

Section 2

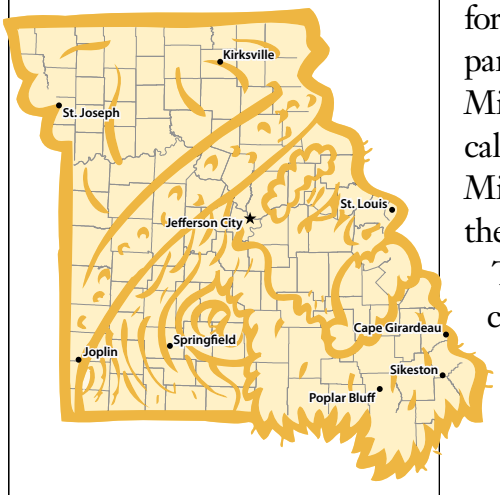
Finding Missouri

As you read, look for the following:

- the two major rivers of Missouri
- the shape of Missouri on a map
- the states that border Missouri
- vocabulary term **confluence**



Above: The confluence of the Missouri River and the Mississippi River.



We already know that Missouri is in the Western and the Northern Hemispheres, that it is on the continent of North America, and that it is one of the 50 United States. Could you find Missouri on a map of the United States?

If all you had was a physical map of the United States that did not show state lines, you could still easily find Missouri. Look at a map of the United States. Notice that there is a long river that runs down the middle of the country. That is the Mississippi River. Now look for a long river that starts in the Rocky Mountains in the western part of the United States and flows south and east toward the Mississippi. That is the Missouri River. Where rivers meet is called a **confluence**. Missouri, the state, is located west of the Mississippi River and on either side of the Missouri River near the confluence of these two great rivers.

That is a good clue to have. It should help you find the confluence of the Missouri and Mississippi rivers on a political map that shows the state's boundaries. What does Missouri look like? Some people say it looks like the head of an old man with a beard. Do you see the beard?

Let's take a trip around the state's borders, starting in the northeast corner where the Des Moines River meets the Mississippi. The Mississippi forms the eastern border of the state and across the river are three states: Illinois, Kentucky, and Tennessee. We say these states *border* Missouri. How many more states border Missouri? Keep going and keep counting.

Follow the Mississippi south all the way to the old man's beard in southeast Missouri. We call this part of the state that sticks down on the map the *Bootheel* because it also looks like the heel of a boot. Most of the southern border is a straight line that is at 36 degrees 30 minutes north latitude (36° 30'). But the Bootheel's border reaches south to the 36th parallel. That part of the border between the two parallels is formed by the St. Francis River.

On the southern side of this border is the state of Arkansas. How many border states have we counted so far?

Follow the southern border to the southwest corner of the state. This corner is where the states of Missouri, Arkansas, and Oklahoma meet. From the southwest corner, the border goes north along a line that follows 94° 37' of longitude until it reaches the Missouri River. Oklahoma and Kansas are two states along this part of Missouri's western border. The Missouri River forms the rest of the western border, going northwestward to 40° 35' north latitude. This is the northwest corner of the state. Across the river is another border state, Nebraska.

Missouri's northern border follows a straight line along 40° 35' north latitude until it reaches the Des Moines River, where we started this trip around the state. Across the northern border is Iowa. How many border states does that make? You should have counted eight.

Map 7

Missouri's Borders

Map Skill: How many borders are straight lines?

Do You Remember?

1. The confluence of what two rivers is shown on Map 7?
2. How many rivers form Missouri's borders?

Did you Know?

John Hardeman Walker owned a plantation in what we now call the Bootheel. When he found out the proposed southern border of Missouri would place his plantation in Arkansas, he asked that the state line be redrawn so his plantation would be in Missouri.

Spotlight

Time Zones

Around noon each school day in Missouri, students just like you are eating lunch. But when it is noon in St. Louis, it is also noon in Kansas City, and noon in Kirksville, and noon in Licking, and noon in Hayti, and noon in King City. It is noon all over Missouri and most of the Midwest. But that wasn't always the case.

We generally think of noon as being the middle of the day. Before there were clocks, people used different methods to tell when it was noon. The most common was a sundial. When the sun is at its highest point in the sky, it casts the shortest shadows. When the shadow of a stick stuck in the ground was at its shortest, people knew it was the middle of the day. After clocks and watches were invented, their owners set them to match a large clock on a church or the city hall, which was set using midday as noon.

Of course, because the sun rises in the east, daylight begins sooner the farther east you live. That was no big deal as long as people could not travel very fast or very far, and they communicated by letter. When it took days to travel from St. Louis to Kansas City, a few minutes difference between the "local time" in one place and in another was not very important. Then people began traveling by train and communicating almost instantly by telegraph. A telegraph sent at noon local time from St. Louis would arrive a few minutes before noon local time in Kansas City.

The time difference in telegraph messages was just an inconvenience. But for railroad passengers, it could be a big, even life-threatening, problem. Passengers who set their watches by local time when they left would find that they might miss their trains at the next station because that local time did not match. Worse yet,

Map 8

U.S. Time Zones

Map Skill: If it is 5 o'clock in Missouri, what time is it in California?

train crews using watches set to two different local times might go down a track thinking the other train had already passed or wasn't due to be on the track until later. Instead, the two trains might end up on the same track, resulting in a collision.

The railroads came up with a solution. In 1883, they divided the country into *time zones*. Within each time zone, they established a *standard time* so that all the railroads and stations in that time zone were on the same time. Before long, all the towns and cities in each time zone adopted standard time. In 1918, Congress passed laws requiring that standard time be used everywhere in the country.

From Maine in the east to Hawaii in the west, the United States covers six time zones: Eastern, Central, Mountain, Pacific, Alaskan, and Hawaii-Aleutian. Missouri is in the Central Time Zone. Each zone is 15 degrees of longitude wide. The boundary lines between time zones aren't always straight, sometimes veering west or east to avoid a town or city. For example, most of Indiana is in the Eastern Time Zone. But Gary, in the northwest corner of Indiana, is in the Central Time Zone because it is right next to Chicago, which is also in the Central Time Zone.

Much of the United States also observes Daylight Saving Time from the second Sunday in March to the first Sunday in November. What that means is that in March we set our clocks ahead one hour so that it is one hour later in the evening when the sun goes down. This gives us more daylight hours after school and work. But that also means that sunrise is an hour later, and some of us might be getting ready and leaving for school in the dark. In November, we set the clocks back, meaning an hour less of daylight after school and work. If it is confusing as to what to do when, just remember the old saying, "spring forward, fall back."

Chapter Review

Summary

The Earth can be divided into hemispheres. On a map, lines that run from the North Pole to the South Pole are called meridians. The prime meridian is at 0 degrees (0°) longitude. On the opposite side of Earth, the line is called the 180th meridian. The prime meridian divides Earth into the Western Hemisphere and the Eastern Hemisphere. The equator is a line around Earth halfway between the North and South Poles. The half of Earth north of the equator is the Northern Hemisphere. The half that is south of the equator is the Southern Hemisphere.

Lines on a map running from north to south are called lines of longitude. Parallel lines running from west to east are called lines of latitude. When finding a location on a map, we refer to its longitude and latitude in degrees and minutes.

Maps may include other types of information about such physical features as rivers and elevation or such political features as county lines and cities. Maps are also used in transportation to navigate, or find the way, from one place to another.

Missouri is in the Northern and Western Hemispheres on the continent of North America. It is one of the 50 United States. It is located in the center of the country at the confluence of the Missouri and Mississippi rivers. The rivers help form the state's boundaries. Eight states border Missouri.

Remember

Match the following terms with the correct definition.

a. atlas
b. confluence
c. continent
d. elevation
e. equator
f. geography
g. hemisphere
h. latitude
i. longitude
j. navigation
k. prime meridian

1. the meridian of 0 degrees longitude that runs through Greenwich, England
2. the exploration and discovery of new places, new cultures, and new ideas
3. half of a sphere or globe
4. an imaginary line halfway between the North and South Poles
5. a large landmass on the globe
6. imaginary lines that run north-south on the globe and measure distance east and west of the prime meridian
7. using a map to find your way or to find out where you are
8. imaginary lines that run east-west on the globe and measure distance north and south of the equator
9. the height of the land above sea level
10. a book of maps
11. where two rivers meet

Understand

Answer the following with complete sentences.

1. Explain the difference between cultural geography and physical geography.
2. In which two hemispheres is Missouri located?
3. Why do we need a global grid system?
4. Name the eight states that border Missouri.
5. Where did "the Bootheel of Missouri" get its name? Where is it located?
6. Which agency is the main cartographer for the United States government?

Think About It

Think about where you live in Missouri. On a separate piece of paper, draw the state of Missouri. Include where you live, the capital city, major rivers, and a compass rose.

Write About It

1. Write a paragraph explaining the location of Missouri in relation to other states in the United States.
2. Imagine you are taking a trip across Missouri. Write descriptively about how the elevation changes as you travel across the state.

Use The Internet

Go to website **www.quia.com/quiz/318883.html** to test your knowledge of latitude and longitude. How did you do?

Work Together

1. With a partner or in a small group, create a pictorial brochure of the state of Missouri. Include places you have been and places you would like to take a visitor if he or she came to visit you.
2. With a partner or in a small group, use maps with latitude and longitude and write at least three questions and answers about the latitude and longitude of various places in Missouri. Then exchange papers with another team and try to answer each other's questions.