

▶ **Key Ideas**

BEFORE, YOU LEARNED

New discoveries and ideas revolutionized Europeans' approach to science.

NOW YOU WILL LEARN

Voyages of exploration affected Europeans' view of the world.

▶ **Vocabulary**

TERMS & NAMES

sponsor someone who gives money for an undertaking, such as a voyage

caravel (KAR•uh•VEHL) ship designed for long voyages

astrolabe instrument used to measure the angle of a star above the horizon

Christopher Columbus Italian explorer sailing for Spain who reached America in 1492

Treaty of Tordesillas (TAWR•day•SEEL•yahs) 1494 treaty between Spain and Portugal that gave Portugal control over land that is now Brazil

circumnavigate (SUR•kuhm•NAV•ih•GAYT) to sail completely around

BACKGROUND VOCABULARY

skeptical doubtful; questioning

feat accomplishment that shows skill, strength, or bravery



Visual Vocabulary Christopher Columbus

▶ **Reading Strategy**

Re-create the chart shown at right. As you read and respond to the **KEY QUESTIONS**, write a sentence or two that summarize the information in each subsection. Each summary statement is started for you.



See Skillbuilder Handbook, page R4.

SUMMARIZE

The Age of Exploration

The Portuguese used advances in technology to help . . .

By sailing west across the Atlantic, Columbus . . .

After Columbus' first voyage, several European nations . . .



GRAPHIC ORGANIZERS

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The Age of Exploration



Connect to What You Know Inventions and a spirit of investigation helped bring about many scientific discoveries. In this section, you will learn how scientific developments and the desire for wealth led to an age of exploration.

Portugal Leads the Way

▼ **KEY QUESTION** What technology aided Portuguese exploration?

Since the Middle Ages, Europeans had craved luxury goods, such as silks and spices, from Asia. During this time, Italian and Muslim merchants controlled overland trade between Europe and Asia. Merchants from such countries as Portugal, Spain, England, and France wanted a share of this trade. To get this, these merchants needed to find a sea route to Asia.

Henry the Navigator Portuguese merchants were the first Europeans to establish sea trade with Asia. They were able to do this, in part, because they had government backing. Prince Henry, the son of Portugal's king, was a strong supporter of exploration. He set up a school on Portugal's southwest coast for mapmakers, navigators, and shipbuilders. He also sponsored voyages of exploration. A **sponsor** is a person who gives money for an undertaking, such as a voyage. Even though he rarely boarded a ship, Henry became known as "the Navigator."

▲ **Astrolabe** By using an astrolabe to measure the height of the North Star in the sky, medieval navigators could figure out their latitude while at sea.

▼ **Prince Henry's School** The fortress at Sagres (SAH•greesh), at the southwestern tip of Portugal, probably was the location of Prince Henry's navigation school. ▼



Technology and Exploration

Technological advances made at Henry's school aided Portuguese exploration. Shipbuilders there perfected the **caravel** (KAR•uh•VEHL), a ship designed for long voyages. Caravels had the square sails used on European ships and the triangular lateen sails used on Arabian ships. Square sails provided caravels with power, and lateen sails permitted quick turns.

Portuguese sailors also borrowed instruments from other cultures. They tracked their direction with a compass, a Chinese invention. The Portuguese also used the astrolabe, which was invented by the ancient Greeks and improved by the Arabs. An **astrolabe** measures the angle of the stars above the horizon. This information helped sailors find their ship's latitude, or the distance north or south of the equator.

Reaching India By the time that Henry the Navigator died in 1460, the Portuguese had set up trading posts along Africa's west coast. There they developed a profitable trade for gold, ivory, and slaves. Soon, however, they set their sights beyond Africa.

In 1488, the Portuguese explorer Bartolomeu Dias rounded Africa's southern tip. He then sailed up part of Africa's east coast before returning home. Vasco da Gama extended Dias's route, sailing east all the way to India in 1498. A few years later, the Portuguese set up a trading post in India. Then they continued moving eastward. In time, they set up several trade centers in the Spice Islands—present-day Indonesia.

Overland trade from Asia to Europe tended to be expensive, because cargo had to be loaded and unloaded many times. Sea trade, however, was much cheaper. The cargo did not have to be handled so frequently. As a result, the Portuguese could charge less for spices. For a time, Portugal dominated European trade with Asia.

SUMMARIZE Identify the technology that aided Portuguese exploration.

Portuguese Explorations Around Africa A.D. 1418–1498



Columbus Reaches America

KEY QUESTION What mistakes did Columbus make in his voyages?

While the Portuguese headed east to secure trade routes, an Italian navigator named **Christopher Columbus** looked west. He hoped to find a westward route to the riches of Asia.

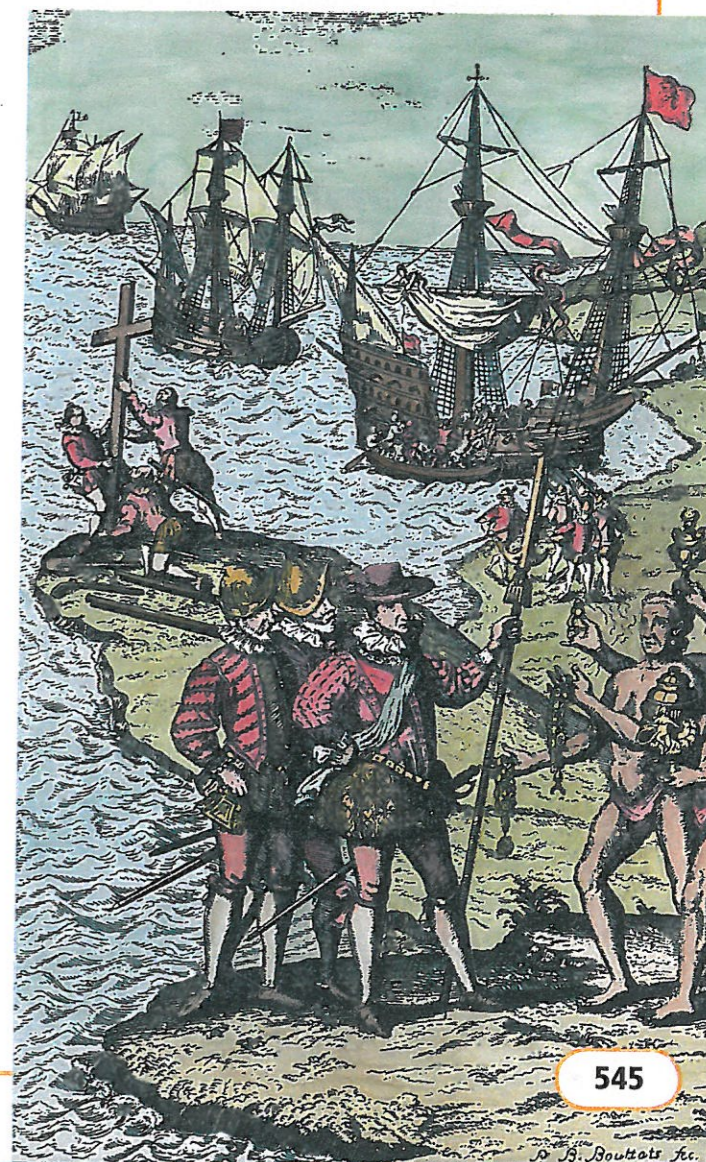
Columbus' First Voyage By studying existing maps and reports, Columbus knew that the earth was round. Based on this knowledge, Columbus thought that he could reach Asia sooner if he sailed west instead of east around Africa. However, Columbus miscalculated the distance around Earth. He estimated this distance at only three-quarters as far as it actually was.

To many people, Columbus' idea of sailing west to get to the east seemed a little strange. The Portuguese rejected it, preferring to continue their search for an eastern route to Asia. Even Spain, which was eager to compete for trade, was **skeptical**. After six years, however, Columbus convinced the Spanish monarchs Ferdinand and Isabella to sponsor his plan.

In early August 1492, Columbus left Spain with three caravels and about 90 men. After almost ten weeks at sea, Columbus' crew grew restless. They had not seen land for over a month and wanted to return home. Columbus persuaded them to continue. Then, on October 12, a sailor called out "*Tierra, tierra*" (Land, land).

Columbus' Mistake Columbus thought this land was India. He even called the people who greeted him and his men *Indios* (Indians). Once again, he was mistaken. He actually had landed on an island in the Caribbean Sea. Columbus explored other islands but did not come across any trade goods. Even so, he was excited at finding what he thought was a route to Asia. He set up a settlement on the island of Hispaniola and then sailed back to Spain. In 1504, the Italian explorer Amerigo Vespucci was the first to prove that this new land was not Asia, but a new continent.

Columbus Lands at Hispaniola This engraving from the 1500s shows Columbus landing on the island of Hispaniola during his first voyage. ▼



Primary Source

Background Diego Alvarez Chanca, from Seville in Spain, served as surgeon on Columbus' second voyage to the West Indies. He wrote of his experiences in a letter to the town council of Seville. In this excerpt, he describes the animals he saw on the island of Hispaniola.

▼ The site of Isabella, Columbus' first settlement on Hispaniola



from *Letter of Dr. Chanca on the Second Voyage of Columbus*

By Diego Alvarez Chanca

No four-footed animal has ever been seen in this or any of the other islands, except some dogs of various colors, as in our own country, . . . and also some little animals, in color and fur like a rabbit, . . . with long tails, and feet like those of a rat; these animals climb up the trees. . . .

There are great numbers of small snakes, and some lizards, but not many . . . [O]ur men saw an enormous kind of lizard, which they said was as large round as a calf, with a tail as long as a lance, which [islanders] often went out to kill; but bulky as it was, it got into the sea, so that they could not catch it.

DOCUMENT-BASED QUESTION

Why do you think Dr. Chanca wanted to describe the wildlife of the West Indies to people back in Spain?

The Treaty of Tordesillas Ferdinand and Isabella wanted to make sure that Portugal, their trading rivals, did not benefit from Columbus' expedition. The Portuguese feared that if Columbus had found a route to Asia, Spain might claim lands that Portugal had already claimed. In 1494, Spain and Portugal signed the **Treaty of Tordesillas** (TAWR•day•SEEL•yahs). This drew an imaginary line from north to south around the world. Spain could claim all lands west of the line. Portugal could claim all lands to the east. This gave Portugal control of one area in the Americas—present-day Brazil.

Additional Voyages Ferdinand and Isabella were pleased with the results of Columbus' first voyage. They sent him on three more journeys west to find mainland India. Although Columbus landed on many islands, he found no proof that he was in Asia. Eventually, Ferdinand and Isabella lost patience with him. Columbus died in 1506, a bitter and lonely man. Right up to his death, he continued to insist that he had reached India. However, people soon realized that Columbus had found a vast land previously unknown to them.

▲ **FIND MAIN IDEAS** Explain the mistakes Columbus made in his voyages.

Exploration After Columbus

▼ **KEY QUESTION** How did exploration in the Americas change the European worldview?

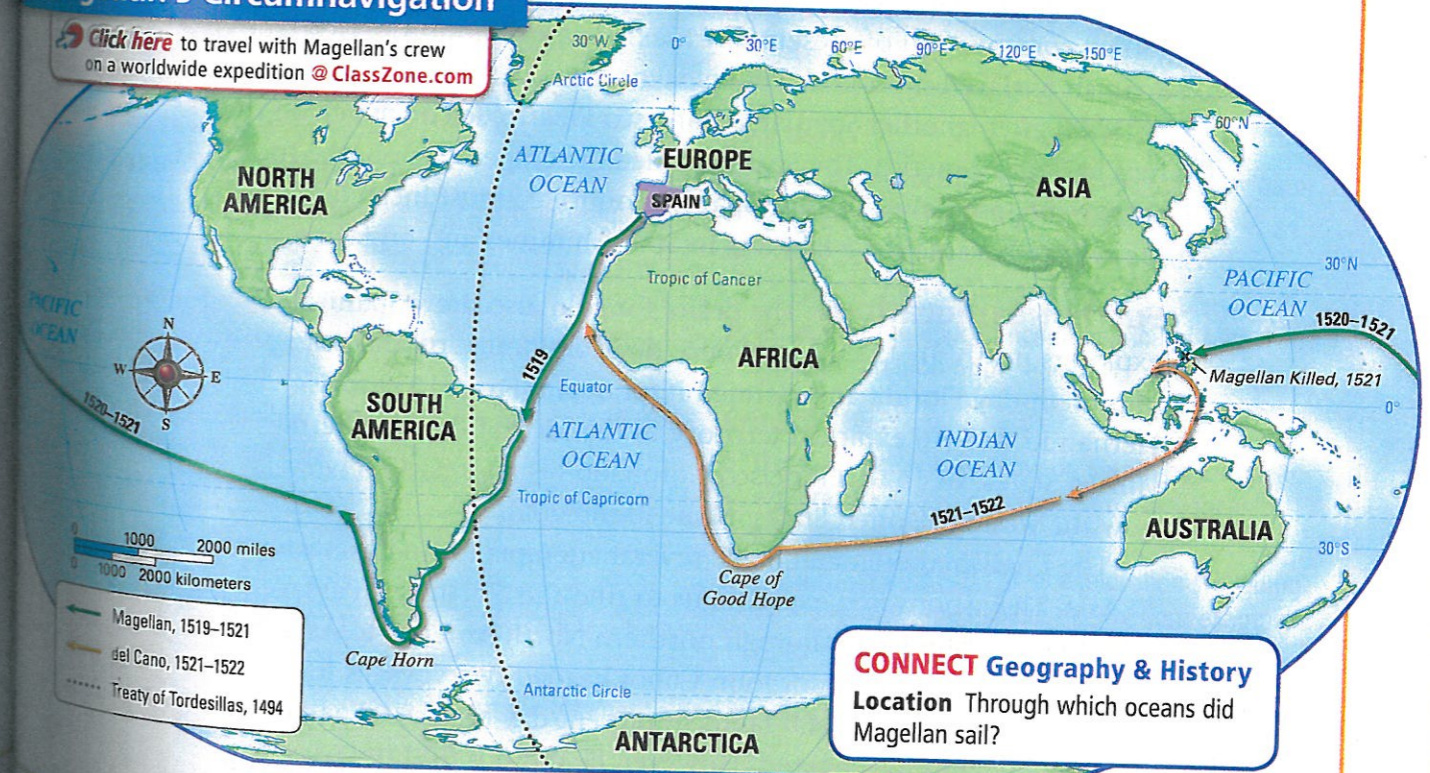
After Columbus' journeys, several countries sponsored voyages of exploration to the Americas. Many explorers were, like Columbus, searching for a fast route to Asia. Others simply sought wealth.

Circling the Globe In 1519, the Spanish sponsored a voyage captained by a Portuguese sailor named Ferdinand Magellan. He set out from Spain with five ships and about 240 men. His goal was to **circumnavigate** (SUR•kuhm•NAV•ih•GAYT), or go around, the world. Up to this time, no one had accomplished this **feat**.

Magellan sailed around the southern tip of South America and into the vast waters of the Pacific Ocean. The ships sailed on for several months without sighting land, eventually arriving in the Philippine Islands. There, Magellan was killed in a local war. His crew, under the leadership of Juan Sebastián del Cano, continued on to the Spice Islands and then home. After a nearly three-year voyage, only one ship and 18 of the original crew members made it back to Spain. Still, the expedition had successfully traveled around the world. In addition, it was an economic success—the ship's hold was full of Asian spices.

Animated GEOGRAPHY Magellan's Circumnavigation

Click here to travel with Magellan's crew on a worldwide expedition @ClassZone.com



CONNECT Geography & History
Location Through which oceans did Magellan sail?

COMPARING Mapmaking Methods

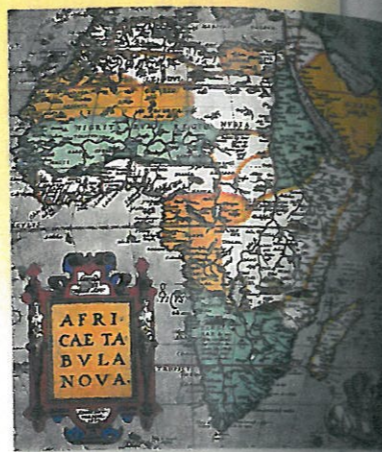
Mapmaking in the Middle Ages reflected ancient knowledge and beliefs. The map at left, made in A.D. 1452, has Jerusalem at its center. It shows only three continents (not one is recognizable), and east is at the top of the map. The map of Africa, at right, is from 1595. It is a fairly accurate representation of that continent.



▲ *Mappa Mundi*, 1452

Mapmaking

Middle Ages	Age of Exploration
Informed by classical sources	Informed by exploration
Reflects values of Church	Reflects advancements in cartography
Shows east at top of map	Shows north at top of map
Useless for navigation	Drawn with navigation in mind



▲ *Africa*, 1595

CRITICAL THINKING

Find Main Ideas What are the most important ways that the two maps differ?

Spanish Conquerors In the early 1500s, many Spanish explorers came to the Americas in search of gold. As you have learned, Hernán Cortés conquered the rich Aztec empire. Within 20 years, Spain had gained control of all of present-day Mexico and Central America. The Spanish enslaved most of the people who lived in these regions.

Soon after, another Spaniard, Francisco Pizarro, led an attack on the Inca in South America. The Spanish killed the emperor; soon, the Inca empire collapsed. By 1535, the Spanish controlled most Inca lands. Many Inca became slave laborers in Spanish mines and on farms.

Further Explorations The desire for gold also drew Spanish explorers north. In 1513, Juan Ponce de León landed on the coast of present-day Florida and claimed it for Spain. From 1539 to 1542, Hernando de Soto explored territory in the present-day southern United States. In 1540, Francisco Coronado began to search what is now the western United States. None found gold.

The English and French made several attempts to find a shortcut to Asia. They sponsored expeditions to find the Northwest Passage, a legendary water route through northern North America to Asia. In the late 1490s, Italian sailor John Cabot headed two voyages for the English. He claimed coastal lands in present-day eastern Canada and the United States for England. However, he did not find the passage.

In 1524, Giovanni da Verrazano (VEHR•uh•ZAH•noh), another Italian sailor, searched for the Northwest Passage on behalf of France. Although he failed to discover a route to Asia, he did explore what today is New York harbor.

Mapmaking and a New Worldview Each discovery made by explorers helped to change the way Europeans looked at the world. Before Columbus' voyages, the European view of the world focused on the Mediterranean Sea and the lands that surrounded it. After Columbus' explorations, the European worldview stretched from the Americas in the west to the Spice Islands in the east.

Cartographers, or mapmakers, played a leading role in changing this worldview. Maps of the early 1500s began to show two new continents in the west. One mapmaker named these continents "the Americas" after Amerigo Vespucci (veh•POO•chee). Vespucci was one of the first to explore and map the coasts of this region. An account of his explorations was published under the title *New World*.

DRAW CONCLUSIONS Explain how exploration in the Americas changed the European worldview.



CONNECT to Today

▲ **Verrazano-Narrows Bridge** The Verrazano-Narrows Bridge in New York City was completed in 1964 and named in honor of the Italian explorer.

2 Section Assessment

ONLINE QUIZ
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Terms & Names

1. Explain the importance of

sponsor astrolabe circumnavigate
caravel Treaty of Tordesillas

Use Your Reading Notes

2. Summarize

Use your completed chart to answer the following question:

How did Columbus' voyages to the Americas affect European exploration?

The Age of Exploration
The Portuguese used advances in technology to help . . .
By sailing west across the Atlantic, Columbus . . .
After Columbus' first voyage, several European nations . . .

Key Ideas

- What impact did the work of Henry the Navigator have on Portuguese explorations?
- Why do you think many people considered Columbus' plan controversial?
- What was the importance of Ferdinand Magellan's circumnavigation of the earth?

Critical Thinking

- Draw Conclusions** How do you think European exploration and colonization in the Americas affected trade?
- CONNECT to Today** Is exploration still going on today? Cite and explain one modern example of exploration.

Activity

Internet Activity Use the Internet to find information to make a time line titled "The Age of European Exploration."

INTERNET KEYWORD: *exploration*

Daily Life

Life on a Ship

If you were a European sailor in the 1500s, you probably worked on a ship like the one shown here. Life at sea during this time was not easy. Voyages often took months and sometimes stretched into years. Living quarters were cramped. Food was of poor quality and often in short supply. And violent storms and shipwrecks were a constant threat.

A The Ship By the late 1500s, most European ships sailing the oceans were galleons. The typical galleon was between 70 and 100 feet long and about 20 feet wide. It was easy to handle and, when under full sail, very fast.

B The Captain The captain usually had a tiny cabin in the stern of the ship. It served as an office as well as living quarters. He kept his maps, charts, and log books there. The charts and logs he kept on the voyage often helped mapmakers draw more accurate maps.

C Navigation Sailors used a compass to figure out direction. Plotting the position of the stars and planets with an astrolabe allowed them to determine their latitude. Maps and charts provided them with further information.

D Food Some ships carried live pigs and hens on deck to provide fresh eggs and meat. However, the day-to-day diet aboard ship consisted of hard biscuits, salted meat, and low-quality wine or beer. Frequently, the meat was rotten, and the biscuits were full of worms.

E Living Conditions Aboard ship, ordinary sailors lived in very cramped conditions. They slept wherever they could find space to sling a hammock. Officers' quarters were only slightly better than those of the sailors.



Activities

- 1. TALK ABOUT IT** Why do you think sailors in the 1500s were willing to undergo such hardships?
- 2. WRITE ABOUT IT** Imagine you are a sailor aboard a ship like this one. Using information in this feature, write a letter to friends describing daily life on the ship.