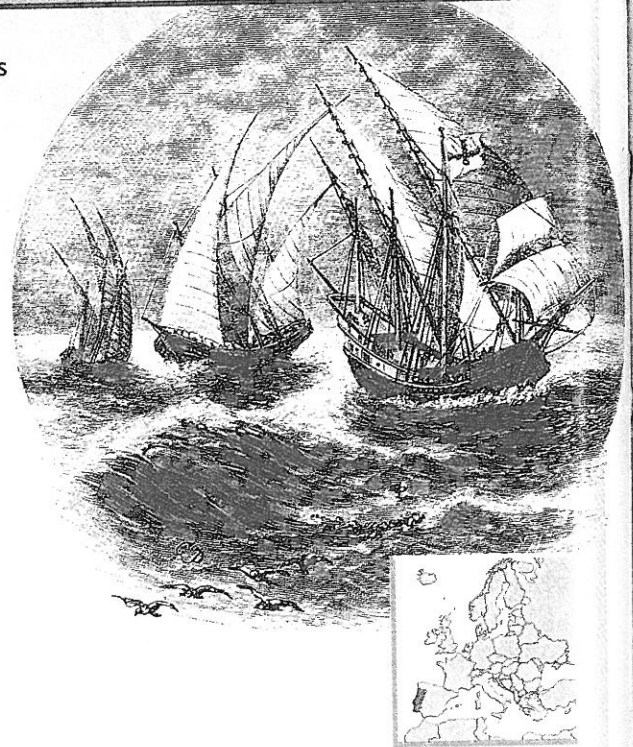


Technology Opens New Worlds

► The triangular lateen sails of this Portuguese caravel were copied from Arabian ships. Lateen-rigged ships could sail against, as well as with, the wind.



◄ Instruments like this Arabian astrolabe helped sailors find their way across unfamiliar waters.

Portugal Takes the Lead Find the political map of Europe in the Atlas at the back of your book. Notice that Portugal is located where the southwestern tip of the continent juts out into the Atlantic Ocean. Would it surprise you to learn that a country with this location has had a long history of seafaring? Portuguese sailors used their great experience on the seas to lead the way in the search for the new trade route.

The success of the Portuguese was due, in large part, to Prince Henry, the son of Portugal's king. In 1419, he opened a school. He invited mapmakers, shipbuilders, and navigators, or expert sailors, from all over the country to attend. Although Prince Henry himself did not go exploring, his work won him the title of Henry the Navigator.

Under Prince Henry's leadership, the Portuguese made many advances. His shipbuilders designed a ship called a *caravel*. It was larger, stronger, easier to steer, and much faster than other types of ships. Portuguese sailors also became expert at navigation. They used the compass to find out which direction they were traveling. They measured their latitude, or distance north or south of the Equator, with an *astrolabe* (AS troh layb). They gathered all the information they could from other sailors to make new, more detailed charts and maps of the Atlantic.

Prince Henry thought that his sailors might find a route to Asia if they sailed south along the western coast of Africa. While they searched, they could build trading ties with the Africans they met. They could also convert these people to Christianity.

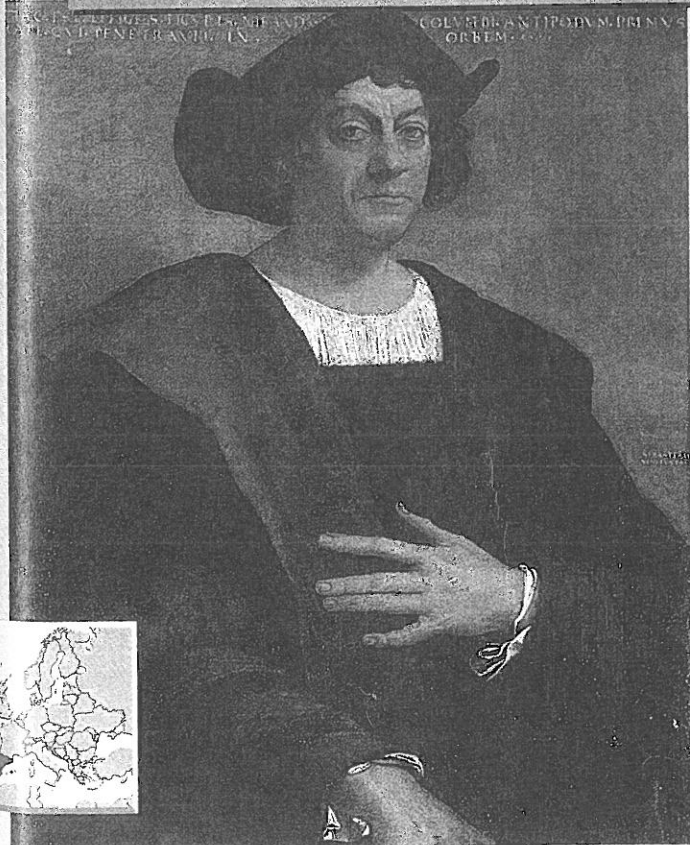
His sailors, however, were unwilling to sail beyond Cape Bojador (BAHJ uh dor). They feared what they might find beyond this small bulge in the coastline of what today is known as the western Sahara. Perhaps they would be attacked by great sea monsters. Or they might be lost forever in what Arab sailors called the "Green Sea of Darkness." Finally, one brave sailor, Gil Eanes (gil YAH neesh), did lead his crew beyond the cape. When he returned safe and sound, the others realized that their fears were unfounded.

Portuguese ships then pushed farther south along Africa's west coast. As they sailed, Portuguese sea captains gathered information on winds, currents, and coastlines. They set up trading posts, bringing such goods as gold and ivory back to Portugal. Finally, in 1497, a Portuguese captain named Vasco da Gama (VAS koh duh GAH muh) rounded the southernmost tip of Africa. From here, he sailed along the eastern coast of Africa and then across the Indian Ocean to India. He returned with a cargo of spices and precious stones. The Portuguese had set up their trade route to Asia.



Connect The early explorers helped people expand their understanding of the world. What kinds of explorations are people making today to help expand our understanding?

Christopher Columbus



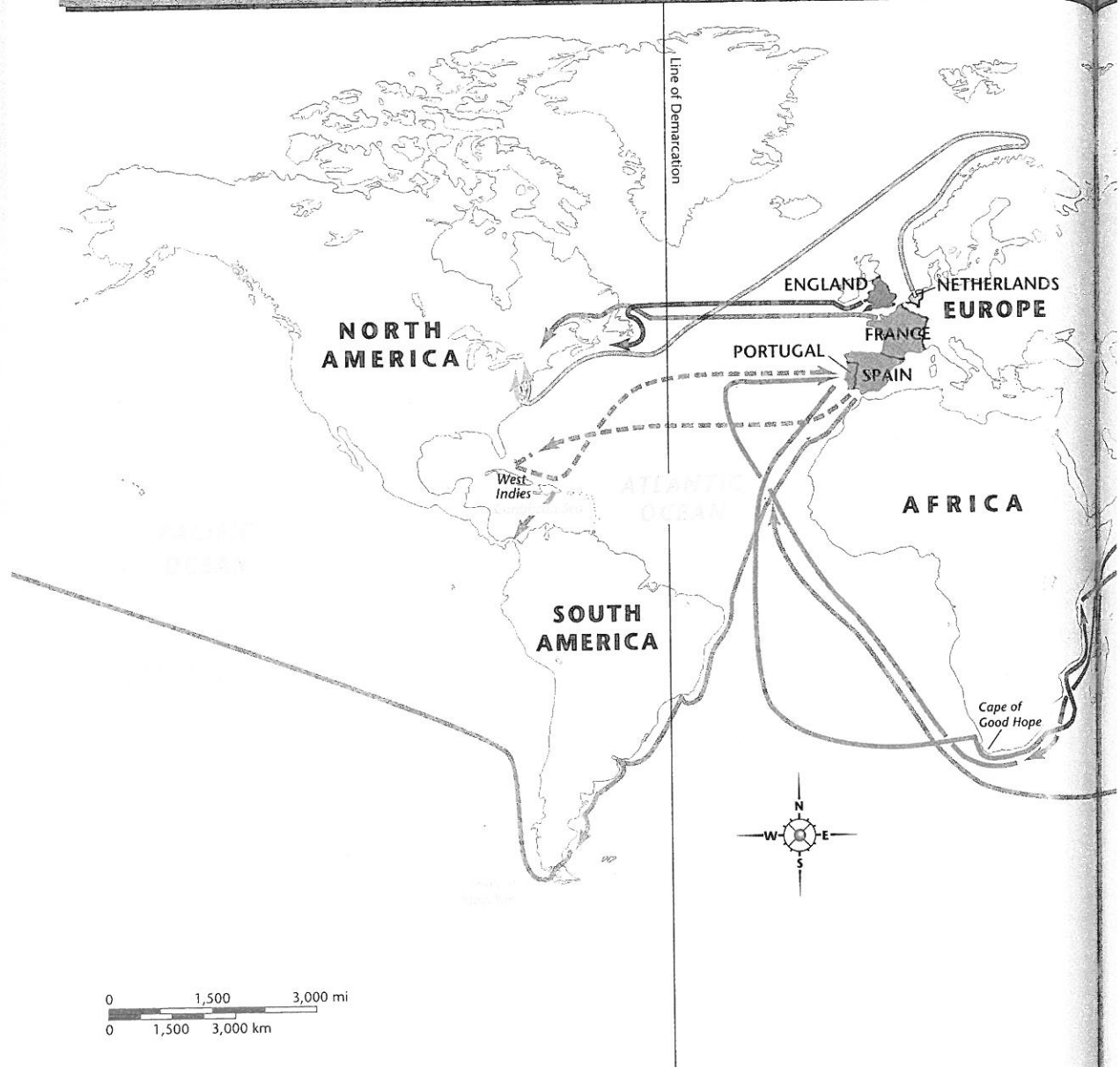
On his first voyage across the Atlantic, Christopher Columbus commanded a fleet of three ships and a crew of about 90 sailors. The journey from Spain to the Americas took more than eight weeks to complete. Below is a copy of the first page of a letter Columbus wrote to King Ferdinand describing the voyage.

De Insulis inuentis

Epistola Cristofori Colom (cui etas nostra multa debet: de Insulis in mari Indico nup inuentis. Ad quas perquirendas octauo antea mensis auspicio erere Inuicissimi Fernandi Hispaniarum Regis missus fueras) ad abagristum dñm Raphaelis Sanzio: eiusdē serenissimi Regis Thesaurarii missa. quam nobilis ac literat⁹ vir Alexander d' Loico: ab Hispano ydeomate in latinū conuertit: tercio h'is abasii. ad. cccc. xciiij. Pontificatus Alexandri Sexti Anno primo.

Quoniam suscepte p̄toulitit rem p̄fectam me p̄secutum fuisse: gratū tibi fore scio: has ostiti c̄parare: que te vniuscuiusq; rei in hoc nostro itinere gēste inuentiq; admonerēt. Tricesimo tertio die post q̄ Cadibus discessi in mare Indicum perueni: vbi plurimas Insulas innumeras habitatas hominib⁹ reperti: quas oim p̄ felicissimo Rege nostro: p̄ceconio celebrato et vestris extensis: contradicente nemine possessione accepti: primo earum: vbi Saluatoris nomen imposui (cuius fret⁹ auxilio) tam ad hac q̄ ad ceteras alias puenim⁹. Eam vero Indi

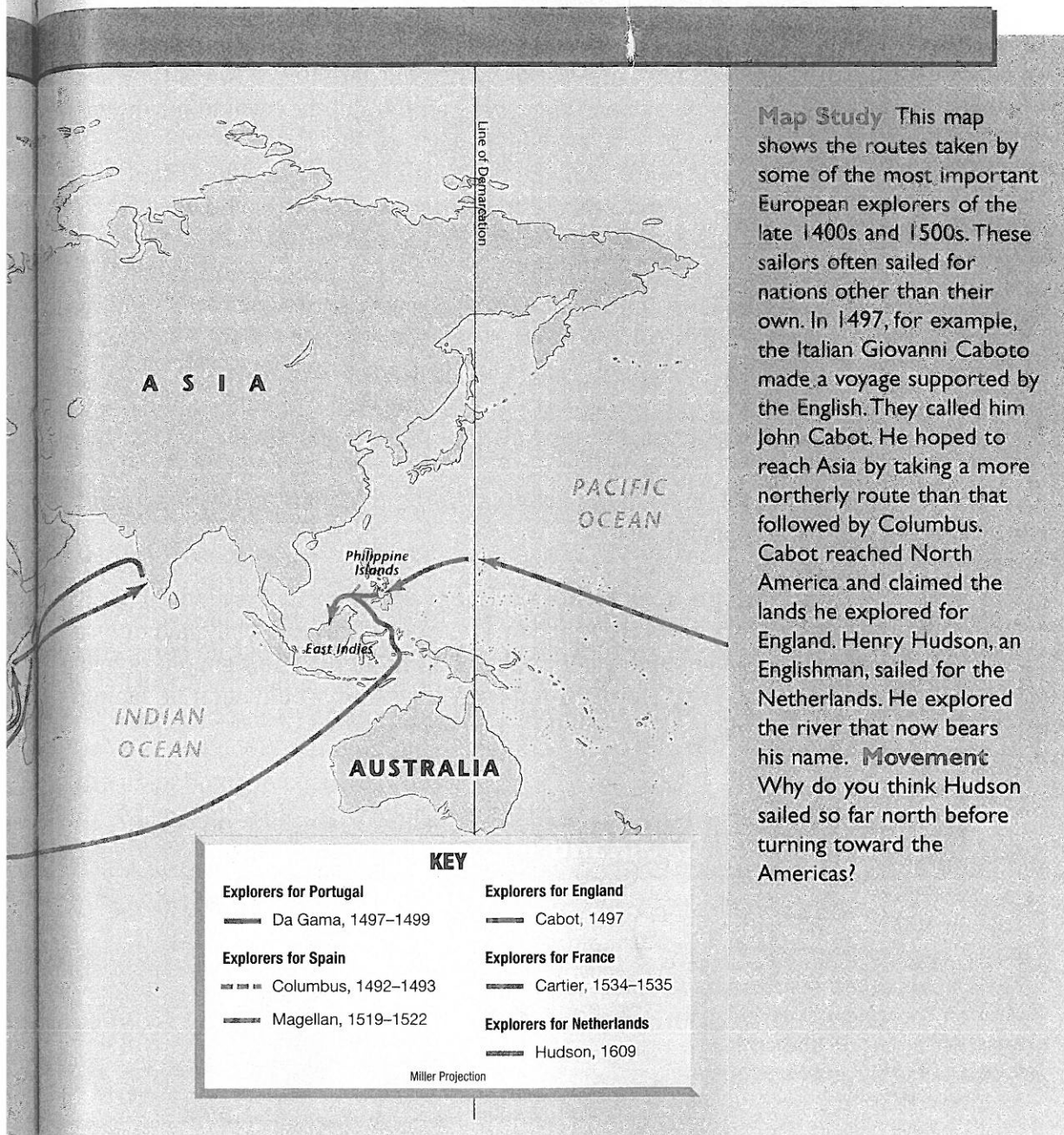
European Voyages of Exploration



Spain's Contribution The Portuguese sailed east to find their route to Asia. An Italian sea captain named Christopher Columbus was convinced that he could reach India by sailing west, across the Atlantic.

Columbus, like many others of his time, accepted that the world was a sphere. Therefore, it made sense to him that a ship sailing west would eventually reach Asia. It made sense to Queen Isabella and King Ferdinand of Spain, too. The thought of the great riches to be gained convinced them to support Columbus's voyage.

What Columbus did not know was that two huge continents lay between Europe and Asia. Thus Columbus reached the Americas, not Asia. Soon, both Spain and Portugal would begin to carve empires out of these continents. In time, other European countries would join them.



Magellan Sails Around the World

Even after Columbus reached the Americas, Europeans did not understand how large the Earth was. They believed that Japan, which they called Cipango (sib PANG goh), was separated from the Americas by only a narrow channel of water. The Portuguese sailor Ferdinand Magellan (FUR din and muh JEL un) was eager to cross that channel.

Magellan Sets Out Magellan was an officer in the Portuguese navy. However, the Portuguese king would not support his journey. Magellan then convinced the Spanish king to back him. Like Columbus, Magellan was mistaken about how far he would have to go.



Ask Questions What questions would you have for the sailors who completed the voyage around the world?

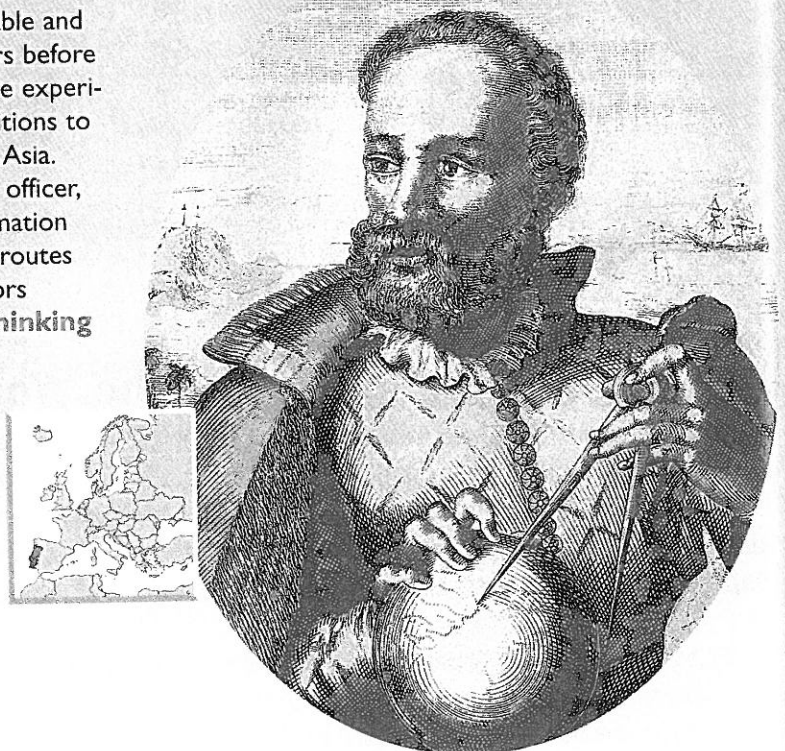
Magellan set sail in 1519 with five ships and a crew of about 250 men. Shortly after reaching the coast of South America, the crews of three of the ships refused to sail on. They were afraid that they would never see home again unless they returned the way they had come. Magellan was convinced that he could not make the trip unless all five ships sailed. He needed every sailor and every ship in order to survive, so he used force as well as skill to persuade the crews to go on.

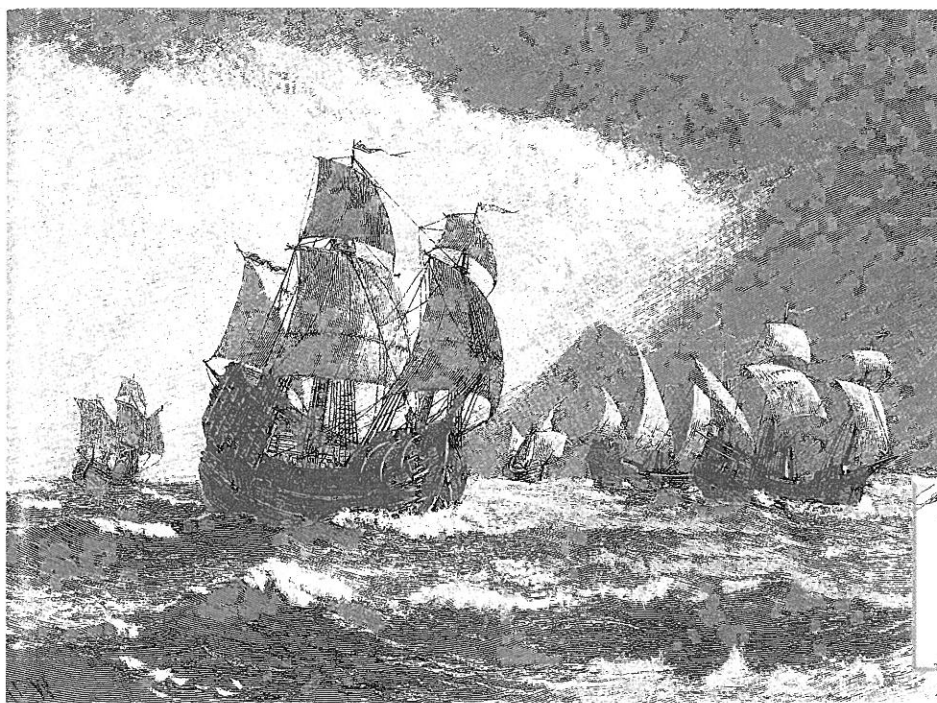
After much searching, the sailors located the passage now called the Strait of Magellan. Ships must pass through these narrow, twisting passages near the tip of South America to get from the Atlantic Ocean to the Pacific Ocean. It took Magellan 38 days to sail through. Strong currents and fierce winds made the journey difficult. Sometimes Magellan thought he was moving rapidly forward when, in fact, his ships were almost at a standstill. The winds in the sails made the ships look like they were making progress while the currents were actually holding them back.

The Voyage Continues But even before they sailed through the straits, Magellan's crews made a terrible discovery. They had only a third as much food and water as they had thought. Their suppliers had cheated them. They were also unaware that they would soon be facing an ocean far bigger than any they had ever seen.

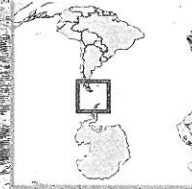
Ferdinand Magellan

Magellan was a knowledgeable and skillful navigator. In the years before 1519, he had gained valuable experience on Portuguese expeditions to India, Africa, and Southeast Asia. Also, as a Portuguese naval officer, he had access to the information about currents, winds, and routes that other Portuguese sailors had collected. **Critical Thinking** How do you think such experience and knowledge helped Magellan to make the difficult voyage around South America?





◀ Here, Magellan's ships round the southern tip of South America. Magellan named the area *Tierra del Fuego* (tee EHR uh del FWAY goh), or "Land of Fires," because his sailors saw many fires on land.



With one third of the food they had thought they needed, they continued on a journey that would be much longer than they had expected. The crews had to live on short rations. Some men starved to death or died of disease. Those who lived ate biscuits full of worms. They soaked and cooked the ox hides they had used to cover equipment on the ship. Some even ate sawdust.

Magellan's skill as a sailor took them across the Pacific Ocean. But Magellan did not live to return to Spain. He unwisely became involved in local politics in the Philippines, islands off the coast of Asia. In the spring of 1521, Magellan was killed in battle by a Philippine ruler. More than three years after leaving home, one ship returned to Spain. Of the roughly 250 sailors who had set sail with Magellan, only 18 returned. They were the first people to **circumnavigate**, or sail around, the world.

SECTION 2 REVIEW

1. **Define** (a) navigator, (b) caravel, (c) astrolabe, (d) circumnavigate.
2. **Identify** (a) Henry the Navigator, (b) Ferdinand Magellan, (c) Cape Bojador, (d) Strait of Magellan.
3. What did Henry the Navigator do to make Portugal a leader in exploration?
4. (a) Name two explorers who sailed for the monarch of Spain. (b) Explain what they accomplished.

Critical Thinking

5. **Identifying Central Issues** What special characteristics do you think an explorer needs? Explain your answer.

Activity

6. **Writing to Learn** You are a member of Ferdinand Magellan's crew. Write a journal entry about sailing across the Pacific Ocean for the first time.