Maritime history is an important part of this country's past and provides a critical foundation for understanding the settlement and development of the North American continent over the past five centuries. Teachers, historians, and maritime experts have worked together to create this manual, providing educators with materials to incorporate the history of ships and other water crafts into courses in the arts, social studies, and science. This manual, prepared by the History Channel and directed toward children in grades 5 through 8, can be used as an introductory overview or as a separate lesson plan. Teachers, for example, could develop a unit to study clipper ships. There are three lessons: (1) "Ships across Time: An Overview"; (2) "Merchant Ships and the Slave Trade"; and (3) "Navigating the Seas." Each lesson contains questions for discussion and extended activities. The activities support national history standards. (Contains a glossary and lists Internet and print resources.) (BT)
Maritime history is an important and exciting part of our past, but it is often neglected in the classroom. Teachers, historians, and maritime experts have worked together to create this manual, providing educators with materials to incorporate the history of ships and other watercrafts into a variety of courses. Why not create a special unit with the art, social studies, and science teachers working together to study clipper ships? Or use the story of the Amistad as a case study on slavery and the slave trade? Maritime history provides an dramatic window through which to examine the evolution of steam power, or the development of the China Trade, and fits easily into existing national standards.

You can use this manual as an introductory overview or as separate lesson plans. Either way, the subject matter can grab your students' interest and help you generate the spark of learning that is so intrinsic to effective teaching.

The preservation of our maritime heritage is an important part of Save Our History, The History Channel's national campaign dedicated to historic preservation and history education. We encourage you and your students to visit maritime museums or take electronic field trips via the Internet to the websites we've recommended.

We love feedback. Please let us know how you are using this material and how your students respond. You can e-mail us at save@history.com, or fax us at 212-551-1540.

Libby Haught O'Connell, Ph.D.
Historian-in-Residence, The History Channel

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The History Channel Credits

Editor Libby Haught O'Connell, Ph.D.
Business Manager Beth Marian, M.Ed.
Writers Louise P. Maxwell, Ph.D.
Jessica Rosenberg
Graphic Designer Scott Russo
Creative Services Debra L. Volz
Coordinator Lourdes Melendez-Ganez
Business Coordinator Lourdes Melendez-Ganez
TO THE TEACHER

America's maritime history provides a critical foundation for understanding the settlement and development of the North American continent over the past five centuries.

The activities in this manual are designed to give students a general overview of the evolution of ships and their changing, yet steady, role in American and World history. Many of the extended activities offer opportunities for interdisciplinary instruction, encompassing math, science, art and language arts, as well as history. This manual is directed toward students in grades five through eight; however, the lessons presented here may be adjusted for use with students either above or below these target grade levels.

PROJECT OBJECTIVES

By studying the evolution of ships and their role in American history, students will develop their skills of chronological thinking and historical analysis, and will understand cause-and-effect relationships.

NATIONAL STANDARDS

The activities in this manual support the following standards: the National Standards for History developed by the National Center for History in the Schools for grades 5-12, Standards 1-3 for Eras 1, 2, and 6-10; and the Curriculum Standards for Social Studies developed by the National Council for the Social Studies, Strands II, VII, VIII, and IX.

VOCABULARY

Any social studies unit involves learning new vocabulary. You will find a glossary at the end of this manual that defines key words printed in bold.

LESSON 1: SHIPS ACROSS TIME: AN OVERVIEW

HISTORY, SCIENCE & LANGUAGE ARTS

INTRODUCTION

For centuries, ships have been used to carry people and goods across vast oceans and seas. Over time, countries increasingly relied on ships for trade and for war. Ships carried passengers and cargo, defended trade routes, and battled enemy ships. As countries competed for dominance of the seas, they constantly worked to improve their ships. This has meant that over the years, ships have changed a lot, becoming faster, safer, and more efficient. Yet despite these changes, ships today still function in many of the same ways that they did hundreds of years ago, playing a role in transportation, commerce and war.

BUILDING SHIPS

As soon as humans discovered that they could float on the water by binding together reeds or logs or by filling animal skins with air, they began building boats. But none of these boats were ships—an important point to remember, since many people confuse the terms "boat" and "ship." Ships are larger in size than boats, and thus are capable of transporting more people and cargo. For the very first boats, built as early as 6300 B.C.E., people hollowed out trees, but because these "dug-outs" over-turned easily, they were not very good for carrying passengers or cargo. Ancient Egyptians, who were the world's first great shipbuilders, constructed boats around 3400 B.C.E. out of papyrus reeds, which grew beside the Nile River.

The first ships appeared when Egyptians began fixing planks of cedar wood together to create the first ship hulls, the bodies of ships capable of carrying passengers and cargo. The world's oldest surviving ship is a cedar funeral barge that was constructed around 2500 B.C.E. for Pharaoh Cheops, who is best known for building the Great Pyramid. Early Egyptian ships were like galleys, which meant that they had oarsmen on each side, one large, center sail, and a long ram on the ship's bow, which was used literally to ram and sink enemy ships.

Later ship designers adapted the Egyptians' ideas, fixing the planks together by two different methods. In one design, called clinker construction, they overlapped the planks to create a ship hull. In the other, more sophisticated design called caravel, they started with a strong hull and then laid the planks over it, side-by-side. The best-known clinker ships were Viking longships. Viking longships, which appeared in the 8th century in Denmark, Norway, and Sweden, became the most important ships of the open seas. These longships were used to carry Viking warriors across Europe and to North America and could be rowed by groups of oarsmen on each side or sailed by a single, square sail.

In the late 15th century, European shipbuilders abandoned clinkers for caravels. The caravel was a fairly small ship, with a rounded bow and a square stern. Its curved hull caused it to sit higher in the water, a quality that made the ship lighter and faster than earlier models. As a result, many European explorers from the 15th century onward, including Christopher Columbus, chose the caravel to sail across the open seas.

When new technologies and new materials became available during the Industrial Revolution, shipbuilders began using iron and steel to make their ships stronger and more durable. During the mid-1800s, shipbuilders began covering their warships with iron plates, creating ships known as ironclads. Most ironclads sat lower in the water than other boats of the time, giving the enemy little to shoot at, and had enclosed gun turrets. These features made ironclads important ships in the American Civil War. When two ironclads, the Confederates' Merrimack and the Union's Monitor, met in combat in 1862, they shot at each other for more than two hours without ever piercing the armor of the other. The use of iron and steel in shipbuilding clearly changed the character of naval warfare.

During the 20th century, technological improvements have continued to change not only the nature of naval warfare, but also the ways in which people and goods are transported across the seas. Today, ships are constructed from all kinds of synthetic materials, like glass-reinforced plastic, making travel and transportation faster and easier.

POWERING SHIPS

In addition to improvements in the way that ships are constructed, there have also been big advances in the way that ships are powered, that is, how ships are moved forward. Until about 1500 C.E., ships were propelled by a combination of oars and sails. The Egyptians used a simple, square sail to propel their ships, and this was the only sail that was used for many years. Chinese junks and Arab ships called dhows, meanwhile, used more angular sails, which European merchant ships finally adopted in the Middle Ages. By the seventeenth century, European ships were employing a variety of sails of different shapes and sizes. Even after the development of steam power in the nineteenth century, sail continued to be an important component of ships for many years.

Experimentation with many different kinds of sails led to the development of the clipper ship, the fastest sailing ship in existence, in the mid-1800s. Clipper ships were designed specifically for speed, and were so named because they could "clip" days off of a typical sailing voyage. The hulls of clipper ships were very narrow, to cut through the water as easily as possible, and they were designed to use as much sail power as possible. One of the most famous clipper ships was the Cutty Sark, which had sails on three masts, and had a maximum sailing speed of 17 knots.

Although sails continued to be important to ships, the Industrial Revolution of the nineteenth century...
which then turned propellers that were mounted at the back of the ship. These new engines were much faster and more efficient than the earlier paddlewheels, since they were much lighter and did not stick out from the sides of the ship.

These advances in the steam engine made possible the emergence of great passenger liners in the late 19th century. Passenger liners quickly became the preferred method of travel across the Atlantic Ocean, and they remained the fastest and most comfortable option until the appearance of affordable air travel in the 1960s. By the 1930s, really luxurious passenger liners, known as luxury liners, offered first-class passengers a dizzying array of dances, dinners, and parties, all in elaborately decorated surroundings. Even third-class accommodations, or steerage, often offered its passengers a step-up from their typical living conditions. Many people have heard of the Titanic, the famous ship that sank off the coast of Newfoundland when it collided with an iceberg. But other ships, of the time were equally famous. England's Queen Mary and France's Normandie were two of the best-known luxury liners of the 1930s. The Queen Mary measured 1,017 feet long and 118 feet wide, making it the biggest ship ever built at that time. In the late 20th century, turbine engines were replaced by water jets, which function almost like an octopus, drawing water in and driving it out under great pressure through pipes at the ship's stern. This new engine has made for even faster travel. One modern ship that uses a water-jet engine is the Hoverspeed Great Britain. In 1990, the Hoverspeed broke the record for the fastest Trans-Atlantic crossing. Forty years earlier, a ship had made the crossing in 3 days, 10 hours, and 40 minutes; the Hoverspeed made this trip in 3 days, 7 hours, and 54 minutes.

Modern Ships

Submarines, which can travel on and below the water, are another example of the amazing advances that have been made in ship construction and ship propulsion. The first submarines, built in the early 1600s, had wooden frames, were covered by greased leathers, and were propelled by oars that stuck out through small, airtight holes. Since that time, remarkable improvements have been made in submarine design. Submarine hulls, which are shaped like cylinders, are surrounded by outer rings that can be filled with air or water. (Think of a doughnut, with the hole in the middle as the submarine hull, and the actual doughnut as the outer ring.) This outer ring actually is split into two parts, called ballast tanks, that have vents which can be opened to let water in when the submarine needs to submerge. When the submarine is underwater, its ballast tanks are filled with water. When the submarine is coming back to the water's surface, the top vents are shut and compressed air forces the water out of the tanks. When the submarine is floating on the water, the vents are closed, and the tanks are filled with air. It was this kind of submarine that played an important role in the First, and especially the Second, World Wars. Today, many countries rely primarily on nuclear submarines, which are capable of remaining underwater for months at a time and of firing long-range nuclear missiles without surfacing. These improvements have made submarines an even more important part of naval warfare than before.

Ships, such as submarines, have been and continue to be critical to naval warfare, but ships also still play a crucial role in shipping cargo. One of the most important commodities transported by ship today is crude oil. In fact, the demand for oil has become so great around the world that it has led to the construction of the largest ship ever built—the supertanker. The supertanker is almost completely devoted to carrying cargo; nine-tenths of a supertanker is used for storage tanks, while only one-ninth is used for engines, passengers, and control rooms. The Jahre Viking, the world's largest supertanker, measures 1,591 feet long, 226 feet wide, and weighs more than 565,000 tons!

Because supertankers like the Jahre Viking are so huge, they are very difficult to steer and to dock. Supertankers sit too low in the water to come to shore, so they dock at deep-water anchorages, instead. Here, supertankers can hook up to a pipeline and pump their oil to shore. This process is very risky and can destroy the environment if an accident occurs. When the Exxon Valdez had an oil spill in 1989, it leaked 11 million gallons of oil into the water, polluting more than 1,000 miles of coastline. This disaster has demonstrated the need for even safer and more efficient ships, in spite of the tremendous advances that have been made in ship design over the past centuries.

Conclusion

Even though ships have changed a lot since the first recorded ships put to sea some 5,000 years ago, they continue to perform many of the same vital functions for human civilizations that they
always have. Ships still play important military roles, defending trade routes and battling enemy nations. They still carry people across vast oceans, and they still carry cargo upon which so many people depend. Even in the age of space and air travel, ships continue to transport the world’s heaviest cargoes and offer passengers the most luxurious accommodations for long-distance travel. Ships certainly will remain central to our national heritage for years to come.

Questions
1. Explain the difference between boats and ships. What made the Egyptians’ first boats different from later ships?
2. What is the world’s oldest surviving ship? What does its function tell you about Egyptian society?
3. Describe the difference between clinker and caravel ships. Why did early explorers like Christopher Columbus prefer caravels for long-distance travel?
4. What effect did the Industrial Revolution have on ship design? How do you think that these changes affected modern warfare on the ocean?
5. Why do you think that early ships relied on both oars and sails for power? What disadvantages would clipper ships have had, even though they were the fastest sailing ships in existence?
6. Even though steamships were evidence of an important technological advance in ship design, they still had certain shortcomings. Describe some of these problems.
7. Describe the evolution from steam to turbine to water-jet engines.
8. Why are supertankers so vital to human society today?
9. What advantages do submarines have over other ships in naval warfare?

Extended Activities
See our Resources section at the end of this manual for web site and print sources for additional research.
1. Do additional research on the Viking longship, the Spanish caravel, or the paddlewheel steamship. Find out as many details as you can about the ship’s construction and its uses. Draw a picture of the ship that you have chosen to study and then present the drawing in class. After all of your classmates have presented their drawings, “frame” the prints with construction-paper backing and display the prints on the walls of the classroom.
2. As a classroom or homework assignment, find out more about the famous Civil War battle between the Merrimack and the Monitor. When did this battle take place? What was its significance in the overall picture of the Civil War? How did this battle help change naval warfare? Individually or with a partner, create a poster-board exhibit on this battle and these famous ships, illustrating the significance of this naval engagement.
3. Ships always have been more than merely functional. They often carry tremendous emotional significance for people, as is evident in the age-old tradition of naming and christening ships. Research the name of one ship and write a brief essay to explain how and why it got its name. Be sure to explain the significance of the name.
4. A number of famous American writers have written about ships or about life at sea. Find an example and choose a passage from the novel or poem (or song) that depicts the power of the sea. You might recite the passage to the class, asking other students to comment on what images the passage evokes. Or write out the passage on parchment paper and illustrate the lyrics or words. Mount your illustrated works and create a classroom art exhibit. (Some examples to get you started are: Robert Louis Stevenson’s Treasure Island; Herman Melville’s Moby Dick; Ernest Hemingway’s The Old Man and the Sea; Rudyard Kipling’s Captains Courageous.)
5. Create an illustrated timeline of ships, starting with the earliest known ship, the funeral barge of the Pharaoh Cheops and ending with the supertanker (see suggested timeline below). Identify the ships associated with different historical eras and show the progression of shipbuilding technology. Draw pictures of the most important ships of each type. You could do this as a class project, extending a blank timeline around the walls of your classroom, and having different students work on different ships or time periods.

Sample Timeline
3000 B.C.E. Egyptian Reed Boat
1180 B.C.E. Egyptian War Galley
150 C.E. Roman Merchant Ship
850 Viking Longship
1490 Spanish Caravel
1570-1620 Galleon (leading warship)
1802 First Working Steamship
1859 Ironclads
1897 First Ship with Turbine Engines
1906 Dreadnought
1923 First Aircraft Carrier enter service
1920–1930 Luxury Liners, like the Queen Mary (1934)
1960s Guided-Missile Warship
1980s Supertanker

Lesson II: Merchant Ships and the Slave Trade
History and Geography
The development of ships brought with it the expansion of merchant shipping among different countries. In America during the 18th century, a thriving trade, often referred to as “triangular trade,” developed between the American colonies (and later the United States), the West Indies, the coast of Africa, and the British Isles. “Triangular trade” did not really refer to a specific trade route, but there were two basic patterns or “triangles” of trade established. In one scenario, goods from New England were shipped to the West Indies, where they were traded for sugar; the sugar, in turn, was transported to England, where it was traded for manufactured goods. In another scenario, New England goods were shipped to Africa, where they were traded for slaves, and then these slaves were taken to the West Indies, where they were traded for rum and molasses. Whatever the route, it was clear that slavery was a crucial component of this cycle and that the slave trade was extremely profitable for many participants.

The use of West Indian sugar and molasses in these global trading patterns, for example, was made possible by slave labor. Black slaves in the Caribbean raised and processed sugar into molasses, which then was used by American distillers to make rum, which was exchanged for more enslaved Africans. In addition, African slaves grew most of the cotton, rice, and tobacco exchanged by American merchants for imports such as cotton cloth and English manufactured goods. The slave trade became a hugely profitable enterprise for merchants, not just for those who bought and sold slaves, but also for all of those who traded goods produced by slaves. Chiefs along the African coast kidnapped members of rival tribes and sold them for Western goods. Yankee traders earned their livelihoods by selling goods to plantation owners, and in turn, marketing the goods produced by slave labor. Northern farmers and fishermen, in addition, profited from the sale of these goods to plantation owners. In other words, many different groups of people participated in and profited from the slave trade.

Dutch, French, and English colonization of the Americas opened tremendous new markets for slave traders, especially as it became clear that settlers in these colonies would not succeed in creating a viable agricultural work force from native inhabitants of the land or from European indentured servants. Slavery in the Americas, then, emerged expressly to meet the labor shortage that arose as a result of the spread of staple-crop agriculture.

Most of the slaves that fed the Atlantic slave trade came from the region in West Africa that extended from the Senegal River through the Congo. For enslaved Africans, the Middle Passage, the sea-
voyage across the Atlantic, was undeniably horrific. The enslaved passengers were shackled and stowed below deck where they had little or no access to fresh air and water. Sickness and disease was difficult to control under such unhealthy conditions, and many Africans died during the trip. Most slaves who survived the trip were sold into slavery, and there was little that captured Africans could do to escape this future. On a rare occasion, however, in July 1839, enslaved Africans aboard the Amistad rebelled.

This well-known rebellion occurred when 52 newly arrived African slaves, who had been purchased in Cuba—in violation of the ban on the international slave trade—were being transported along that country's coastline. Led by Joseph Cinqué, the slaves pried open their chains and took control of the Amistad, the cargo ship on which they were being transported. After two months at sea, as the Africans tried to find their way back to Africa, the ship was captured by an American ship and taken to New London, Connecticut, a state in which slavery was still legal. Cinqué and the other Africans aboard the ship were charged with mutiny and brought to trial in U.S. court. Their case made it all the way to the U.S. Supreme Court, where the justices ruled in 1841 that since the Africans had been illegally imported from Africa, they were the victims of kidnapping and thus had the right to attempt escape by any means. In 1842, private and missionary organizations helped raise enough money to send the 35 survivors from the Amistad back to their homes in Sierra Leone.

By this time, ships had ceased to be an important way of supplying slaves to the North American colonies, since the international slave trade had been outlawed. Other countries, like Brazil and Cuba, however, continued to import slaves illegally from Africa for many years. Ships also continued to play a crucial role in maintaining the profitability of slavery, by making sure that goods produced by slave labor could be transported to market. Ships and slavery, therefore, continued to be intertwined long after the legal slave trade had ended, and enslaved Africans continued to provide much of the labor upon which the Atlantic world depended prior to 1860.

Questions
1. What is "triangular trade"? Draw a diagram to illustrate this.
2. What role did slavery and slave labor play in sustaining "triangular trade"?
3. Who were some of the parties involved in keeping the Atlantic slave trade going? Is this web of participants bigger or smaller than you expected? Explain.
4. What was the "Middle Passage"? Why was it so horrific for slaves?
5. Explain the connection between staple-crop agriculture and the expansion of slavery.
6. Describe the events associated with the Amistad mutiny. Why do you think that this was such an explosive issue when it occurred?
7. What role did ships continue to play in perpetuating slavery, even after the end of the international slave trade?

Extended Activities
1. On a map of the world, mark the primary regions of West Africa that supplied the Atlantic slave trade. Also mark the following trading ports in the Americas: Charleston, South Carolina; New Orleans, Louisiana; Rio de Janeiro, Brazil; Havana, Cuba; and Kingston (formerly Port Royal), Jamaica. Using an atlas or some other means, determine the distance of each port from the coast of Africa. In each case, for what distances did the enslaved Africans have to endure the perilous conditions of the Middle Passage?

2. Learn more about the individuals involved in the controversy over the Amistad mutiny (see our Resources section for ideas to get you started). Pretend that you are a reporter and write a short newspaper article on one of the people involved, either in the mutiny itself or in the subsequent court battle, explaining his or her role in the events.

3. The Atlantic slave trade was not the first slave trade in history, but it differed from others in important ways. Do additional research to learn about the differences between the Atlantic slave trade and slavery from an earlier time period of your choosing (examples of other slave societies might include Ancient China, Egypt, Athens or Africa). Make a chart comparing the different ways in which slaves were traded in these two time periods, and present your findings in class. Discuss with your classmates why these differences existed.

This method of celestial navigation worked fairly well for determining a ship's latitude, that is the ship's distance north or south of the equator, because all that a ship captain had to do was measure the height of the sun or the North Star above the horizon. It was of little help, however, in calculating longitude, that is how far east or west a ship is. Measuring longitude depended upon a sailor's ability to make an exact determination of his local time. The problem was that most 17th and 18th century clocks, which were pendulum clocks, were not very good at telling time at sea because the motions of the ship and changes in humidity and temperature threw them off. Even if a clock was off by only 1 minute, a ship could be off course by 15 nautical miles.

It was not until John Harrison perfected a seagoing timepiece—what turned out to be a small pocket watch—between 1731 and 1759 that a sailor could get an accurate reading of time at sea. In 1714, the British Parliament had announced a prize for anyone who could solve the problem of finding longitude at sea, and Harrison, a carpenter's son, solved the problem. Harrison's clock, known as H4, lost only five seconds during a six-week voyage from Britain to Jamaica in 1761-1762. This was an amazing feat, but it took many years for Britain's Board of Longitude to give Harrison his prize because they were skeptical of his invention.
Although the British Parliament was slow to recognize Harrison's achievement, the effects of his invention were felt immediately. Sailors began to depend more and more on such time-keeping devices, and by the 17th century, chronometers, as they came to be called, were standard equipment on most ships. The better that ship captains got at determining their positions on the oceans, the better that they got at making detailed maps. Exploration and navigation thus continued to develop hand in hand.

Technological advances have made navigation more precise, but they also have made accurate navigation more critical. Modern navigation is not just about staying on course, it is also necessary in order for ships to avoid collision with other ships, to minimize fuel usage, and to meet established schedules. Today, ships rely on a variety of electronic devices, like radar, computers, and satellites to determine their positions. Although navigation has been transformed by advances in electronics and space science, it still depends upon the precise measurement of time—just as it did hundreds of years ago during the quest to solve the problem of longitude.

Questions

1. How did celestial navigation work? What kinds of problems might have made this form of direction-finding unreliable?
2. Why was (and is) it so important for a ship captain to know a ship's latitude and longitude?
3. Why was knowing the local time so important to a ship captain trying to determine longitude?
4. Who was John Harrison? What did he accomplish?
5. Why has precise navigation become even more crucial to ship captains today?
6. What kinds of devices do ships use today to determine their position?
Books


Culver, Henry B., Gordon Grant (Illustrator). The Book of Old Ships: From Egyptian Galleries to Clipper Ships. (Dover Pictorial Archive: 1992). Includes 80 incredible line illustrations of history’s most important sailing ships, beginning with an Egyptian galley and ending with a clipper ship built in 1921.

House, Derek. Greenwich Time and the Longitude. (Philip Wilson Publishers, Ltd., 1997). Tells the story of the finding of longitude at sea, which precipitated the founding of the Royal Observatory at Greenwich, over 300 years ago.


La Pierre, Yvette, Islaney Kober (Editor). Mapping a Changing World. (Thomasasson-Grant 

& Lickle, 1996). Introduces young readers to a variety of wonderful attempts to map our world, beginning with an ancient Babylonian map etched on a clay tablet, and ending with a radar image of a Russian volcano.

Tassin, Myron. Ed. The Delta Queen: Last of the Paddlewheel Palaces. Includes an essay and vintage photos tracing the history of steamboating on the Mississippi River, a history of the Delta Queen, and a diary account by one passenger of the “Good Times Jazz Cruise” held in the fall of 1972.


Resources

Web Sites


A concise history of ships and shipping from Compton’s Encyclopedia.


This Scientific American article explains how long, narrow multihulled ferries.


A comprehensive history of ships, ancl shipping from Compton’s Encyclopedia.


A concise history of ships from the National Maritime Museum.

http://www.botsafekids/navigation.htm

BoatSafeKids offers a great history of navigation from 3500 B.C.E. up to the 20th century.

http://www.titanic.cjb.com/

Check out a special exhibit on the Titanic from Britannica Online. Learn all about the luxury liner and its ill-fated passengers through fabulous photos and a wonderful narrative.

http://www.titanic.cjb.com/pages/queenmary.htm

Learn about the famous Queen Mary, the luxury passenger steam turbine liner built in 1936.

http://www.ro.g.nmm.ac.uk/museum/harrison/longprob.html

The Royal Observatory’s online exhibit about the longitude problem and John Harrison’s eighteenth-century solution, the seagoing timepiece known as H4.

http://www.amistadamerica.org

Visit Amistad America’s online exploration of the Amistad mutiny of 1839-1942. Offers valuable resources for teachers.

http://www.ironclads.com

A great site with pictures and descriptions of the battle between the Merrimack and the Monitor.

http://www.civilwarhome.com/cavalry.htm

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