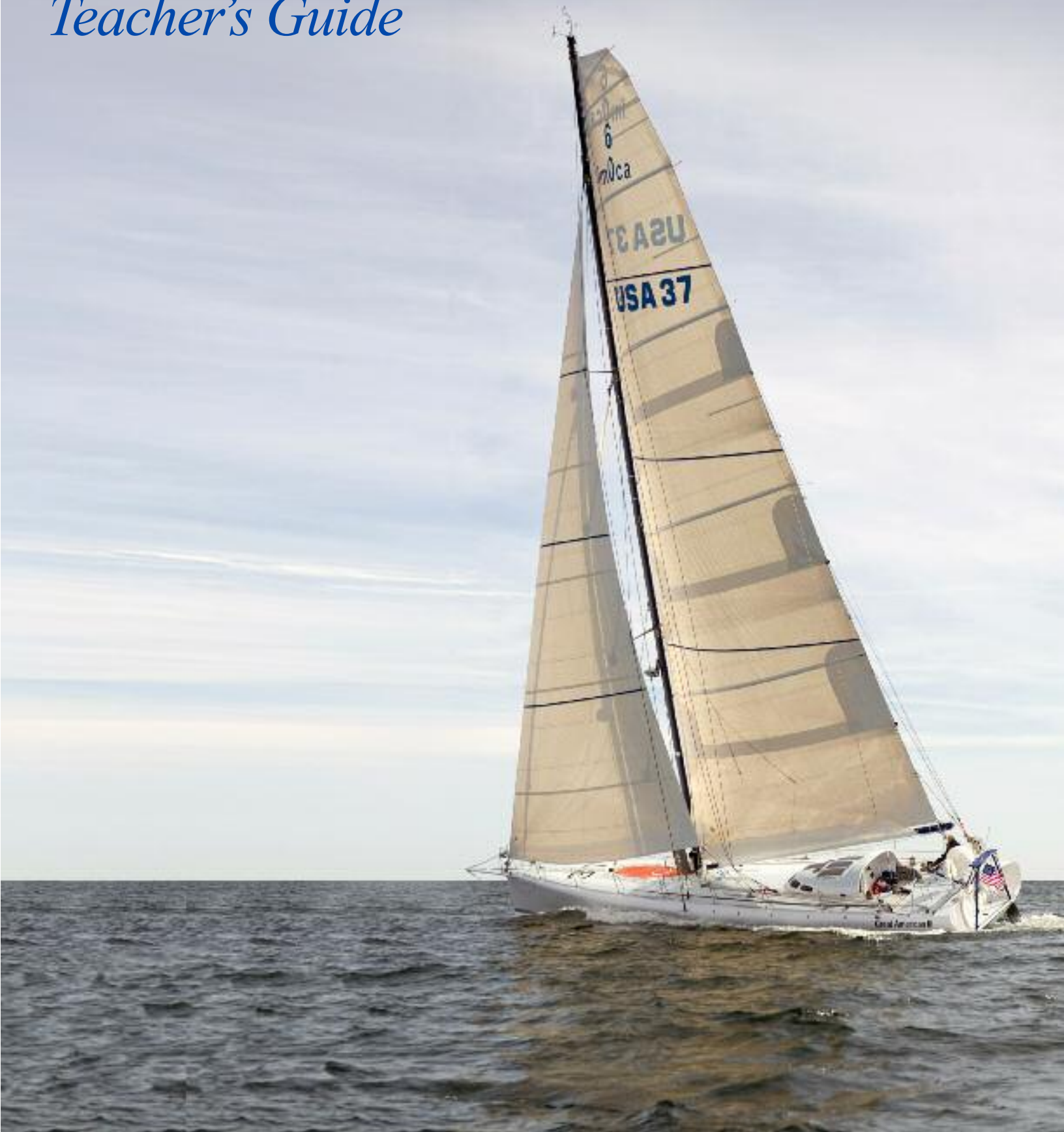
Ocean Challenge Live!
The Vendee Globe

Teacher's Guide



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Introduction

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Purpose of Ocean Challenge Live!

On November 9th, 2008, Rich Wilson will embark on a solo, non-stop voyage around the world aboard the 60' long yacht *Great American III*. Rich will be racing against other ships in the Vendée Globe, widely recognized as the ultimate challenge in sailing. The voyage will cover some 26,000 miles along a route beginning in Les Sables d'Olonne, France, sailing southward past the equator into the South Atlantic, then eastward around Africa's Cape of Good Hope. Rich will than sail through the frigid waters near Antarctica, past Australia's Cape Leeuwin, then across the southern Pacific. He must then pass through the treacherous Straits of Magellan at the tip of South America, from where he will finally head northward, back across the equator, and finally return to where he started in France.

Rich hopes to accomplish this journey of some 26,000 miles in about 100 days. His participation in this race will bring the excitement of the voyage to classrooms and schools around the world via the Internet at **http://www.sitesalive.com.**

A Brief History of Sailing 'Round the World

A ship captained by Ferdinand Magellan of Portugal was the first to sail around the world, embarking from Seville, Spain in 1519 and returning to Spain in 1522. Magellan and his crew sought to discover a southwest passage around the Americas to the Orient. Magellan himself never completed the journey, as he was killed in the Phillippines in 1521, but his voyage proved the Earth was round and was a major landmark in the great era of European exploration.

The first person to sail single-handedly around the world was the American Joshua Slocum, who accomplished this feat aboard *Spray*, a 37' long sloop, between 1895 and 1898. Slocum recounted his adventures in the classic book *Sailing Alone Around the World.* In 1942, during World War II, the Argentinian Vito Dumas was the first to sail solo past the three great capes of the Southern Hemisphere: the Cape of Good Hope, Cape Leeuwin, and Cape Horn, marking the southern tips of Africa, Australia, and South America respectively. Dumas made only three landfalls and the legs of his journey were the longest yet made by a single-handed sailor. Dumas used only the most basic equipment and had no radio for fear of being shot as a spy.

Credit for the idea of long-distance single-handed yacht racing is given to Blondie Hasler and Sir Francis Chichester. In 1960, Hasler, Chichester, and three others participated in first-ever solo race across an ocean. They set forth from Plymouth, England and sailed 3,000 miles across the often-stormy North Atlantic Ocean against prevailing winds and ocean currents. At that time, many believed that the course was an impossible one.

In 1968, Chichester, sailing aboard Gipsy Moth IV, became the first person to single-handedly circumnavigate the Earth from west to east. Chichester made just one stop, and completed the round-trip voyage in 274 days overall (226 days sailing time.) Later that same year, the first round-the-world single-handed yacht race—the *Sunday Times Golden Globe Race*—was held. Sir Robin Knox-Johnston was the only one of nine competitors to complete the race. In the following year, Knox-Johnston became the first person to complete an unassisted solo circumnavigation without a single stop.

In 1978, Poland's Krystyna Chojnowska-Liskiewicz became the first woman to complete a solo round-the-world sailing voyage. In 1988, Australian Kay Cottee became the first woman to circumnavigate the globe by sail with no stops, taking 189 days to complete the trip.

The BOC Challenge, the first solo round-the-world race since the disasterous *Golden Globe* race, was started in 1982. This race is held every four years in four legs with stopovers between. The success of the *BOC Challenge* led to the inaugeration of the *Vendée Globe.*

Introduction

The Vendée Globe

The *Vendée Globe* is a solo, round-the-world race that must be sailed non-stop and without assistance. Dubbed "the Everest of yacht racing," it is widely acknowledged as the single most challenging race in sailing. It is also the only such race in existence.

Frenchman Philippe Jeantot founded the *Vendée Globe* in 1989, and the race has been held once every four years since 1992. The race starts and finishes in Les Sables-d'Olonne, France, and is open to 60' long monohull yachts. Monohulls (boats with one hull) use a heavy underwater keel to remain upright.

The race generally starts in November so that the participating ships can pass through the dangerous waters of the Southern oceans in summer. In addition to being the ultimate test of a sailor's endurance, the race poses many challenges, including severe wind and wave conditions, the possibility of hitting floating ice, and the often long distances from emergency help.

The results of the previous races are shown in the table below.

Year	Winner	Time
1989-1990	Titouan Lamazou	109 d 8h 49'
1992-1993	Alain Gautier	110 d 2 h 23'
1996-1997	Christophe Auguin	105 d 20 h 31'
2000-2001	Michel Desjoyeaux	93 d 3 h 57'
2004-2005	Vincent Riou	87 d 10 h 48'

Riou's finish in the 2004 race set the world record time for completing a single-handed circumnavigation of the globe. The sixth running of the *Vendée Globe* will begin this November. Each of the previous races has had its share of drama. Two sailors have been lost at sea since the race was first held, and several others have been rescued dramatically, in some cases by their fellow racers. Who knows what adventures await Rich and his fellow competitors on this trip?

Rich likes to say that the reason he does these long voyages is because "there is so much to learn and that is what makes it so interesting." And with this sitesALIVE! program, you can learn right along with Rich. Welcome aboard!

Program Components

The descriptions below highlight various components of *Ocean Challenge Live!* and how these can be used to enhance students' experiences as they follow the voyage of *Great American III*.

Internet Connection

Updates of the 2008/09 voyage are available in *Ocean Challenge Live!* on the sitesALIVE! website at **http://www.sitesalive.com.** These updates include:

- Captain's Logs & Audio, Ship Positions, Weather Reports (updated daily)
- Questions & Answers (updated three times/week)
- Essays, Journals, Photos, Video (updated weekly)

By visiting the websites and combining the live content with the lessons in this Teacher's Guide, teachers can make this adventure a true educational experience for their students. Other materials available on the sitesALIVE! website include Rich's biography, a ship tour, a history of the race, a photo and video gallery, and information about sitesALIVE! and its partners.

Lesson Plans

Fifteen weekly lesson plans (plus one extra plan) have been designed to develop students' academic and life skills. The lessons are designed so that students use the same important skills required of Rich and the land-based *Great American III* support team: planning and teamwork. The complete course of study can be organized around the activities built into each lesson plan, or teachers can use activities as they see fit.

Team Projects

In addition to weekly lessons, this Teacher's Guide includes eleven Team Projects for students to complete. A detailed project guide is provided for each Team Project to help students complete the required tasks and assignments. Student should be split up into teams to conduct these projects throughout the voyage of the *Great American III*. Each student team has the opportunity to present a detailed report on their work to the class once during the voyage. Each team should also present a brief project summary on a weekly basis to the class.

Home Connection

Home Connection activities are designed to involve families and friends in the *Ocean Challenge Live!* experience. Through these activities, parents can be encouraged to work with their children on the weekly activities. Many of these activities are discussion topics or short-term projects.

Newspaper Connection

Newspaper Connection activities are designed to develop students' reading and research skills. The weekly activities are coordinated with the lessons so that students can make a connection between the newspaper medium and their own classwork. Students participating in *Ocean Challenge Live!* thus come away with enhanced reading and research skills, as well as a new appreciation of the value of newspapers as an information source.

Project Team Summaries

Suggested team projects are provided below to focus on different aspects of Ocean Challenge Live! Each team project is linked to a weekly lesson. Assign students to work in groups to take responsibility for the projects. Organize a "team of the week" approach, scheduling one group to report its findings to the class most weeks. This can be a full-class presentation. There are a total of eleven team projects, as there is no project or presentation linked to Weeks 2, 6, 7, 11, and 12. The scheduling of presentations is flexible and can be adjusted to match classroom schedules and curriculum plans.

Use the project summaries below and the corresponding Team Project Guides as you organize students and assign tasks. It is also suggested that each team be invited to give a brief update once a week. Schedule at least one collaboration session weekly so groups can update their work.

History Team Project (Week 1)

Learn about and report on the history of ocean exploration and trade.

- Collect information from history textbooks, encyclopedias, navigation resources, and the Internet to demonstrate the ways in which shipping has changed over the past three centuries.
- Compare the challenges faced by explorers from the past with the challenges faced by Rich Wilson today.

Navigation Team Project (Week 3)

Learn about and report on navigation methods, ocean currents, and global wind patterns.

- Plot the weekly position of *Great American III*. Calculate the ship's distance traveled and average speed, and predict its future positions.
- Research the various global wind zones (e.g., the doldrums) and ocean currents that *Great American III* will pass through, including trade winds that affect the speed and direction of the boat.
- Find out the distance/direction to the nearest landmasses.

Geography & Environment Team Project (Week 4)

Research and report on the physical features and environmental concerns of the regions that the *Great American III* passes.

- Collect information from atlases and encyclopedias, about the regions traveled and countries passed along the route. This research can be divided among the team members with each member taking a few weeks' locations to study.
- Learn about and report on the environmental issues facing the oceans and countries that the *Great American III* passes. Include such contributing factors as: fishing and shipping industries, climate change, health of marine ecosystems, land-based pollution, offshore oil drilling, etc.

Project Team Summaries

Energy & Mechanics Team Project (Week 5)

Learn about and report on on board electricity generation (solar, wind, diesel generator) and use for sailing ships (lights, computers, radios, autopilots, desalinator, etc.). Report on the mechanics (sails, ropes, and pulleys), flotation, structure, and materials of the *Great American III*.

- Collect information on basic elements of sailboats. Find out more about monohulls and the advantages and disadvantages of monohulls and multihulls.
- Determine strategies to conserve energy on board and deal with unexpected energy needs.

Information Team Project (Week 8)

Collect and distribute pertinent data and information to the other teams regarding the voyage. Maintain a timeline.

- Seek daily information and data from several available sources (newspapers, encyclopedias, people interviewed, the sitesALIVE! website, etc.)
- Listen to the daily audio updates to get information about the trip and a sense of Rich's mood. (All the teams on a rotating basis could share this responsibility.)
- Maintain a timeline display for the duration of the voyage. This should include items collected from the other project teams.
- Create and post information on a chart and bulletin board display under the titles "Focus of the Weekly Update," "Significant Events from the Daily Audio Updates," and "Stateside Information."

Marine Life Team Project (Week 9)

Research and report on the vast array of marine life found in the regions through which the *Great American III* passes.

- Find out about the variety of vertebrates (fish, reptiles, marine mammals, birds) and invertebrates that populate the oceans along the journey. Learn about food chains, food webs, and migratory routes that any of these animals may take.
- Collect information on various marine-related industries based near the regions in which the ship will travel and the impact these industries may have had on local marine life. Include fishing, whaling, oil exploration, and shipping.
- Record wildlife sightings and encounters reported by Rich.

Weather Team Project (Week 10)

Learn about and report on the weather systems and climatic patterns that affect the *Great American III*'s journey.

- Use the sitesALIVE! website to collect information and report on the air temperature, sea temperature, wind direction and velocity, and rainfall.
- Document the occurrences of storms that the *Great American III* experiences.
- Research the various climate zones that the ship willl pass through and find out how the climatic patterns affect the daily weather.

Project Team Summaries

Teamwork Team Project (Week 13)

Learn about and report to the class on the biographies of Rich, the shore-based crew, and the other participants in the race. Describe their backgrounds, including their sailing experience, and any strengths and/or weaknesses that you may observe.

- Collect information about the progress and problems of the *Great American III* from the sitesALIVE! website. Be sensitive to the feelings that Rich's voice may communicate.
- Find out about how various industries employ a team approach to produce products (e.g., Toyota Manufacturing).
- Create a guide for successful teamwork projects.

Communications Team Project (Week 14)

Research and report on the radio and satellite transmission systems on board the *Great American III*. Compose weekly updates for Rich about local and national events "on shore."

- Find out how radio and satellite communications work and what their respective advantages are. Compare the frequencies the ship uses to those used for television and FM radio.
- "Digest" the newspaper and keep a record of summarized reports to be sent to Rich. Topics can include national and international events, politics, and sports. You might also include the significant local news that directly affects people's lives in your own community.

Book & Movie Team Project (Week 15)

Write the story of the voyage in book form, then create scenes and dialogue for a movie or play.

- Use information from the sitesALIVE! website and information from other student teams to write this story.
- Students with a special interest in art may work as illustrators on this team.

Nutrition & Health Team Project (Extra Week)

Learn about and report on the food, water, medical, and sleep needs of Rich while he is aboard the *Great American III*. Keep in mind that there is no refrigeration on board; water is desalinated; and Rich has severe asthma.

- Find out the average adult male's needs in terms of nutrition, then determine the needs of an individual doing strenuous work for up to 18 hours a day. Do climatic changes affect these nutritional needs? If so, in what way?
- Contact a health professional, pharmacist, or the American Lung Association to obtain information about the causes, treatment, and health risks of people with severe asthma.
- Research essential sleep requirements and recommend a sleep schedule for Rich to follow while sailing the *Great American III*.

Lesson Plan Outline

Week 1– Following Your Dreams

Theme: Career and Life Goals
Skills: Researching, planning, relating cause and effect, analyzing maps

Week 2 – Marine Transportation

Theme: Transportation
Skills: Predicting, designing and redesigning, mapping, calculating

Week 3 – Equator Crossing

Theme: Observing Traditions
Skills: Brainstorming, classification, research

Week 4 – Environment: Water and Air

Theme: Environmental Resources and Impacts
Skills: Converting fractions and decimal percents, model making, writing, graphing, reading maps

Week 5 – Invisible Places

Theme: An Understanding of "Place"
Skills: Mapping, research, letter writing, using empathy, orienteering (using a compass)

Week 6 – Antarctica

Theme: International Cooperation
Skills: Research, relating cause and effect, analyzing maps

Week 7 – Climate Change

Theme: Change Over Time
Skills: Conducting a controlled experiment, graphing, predicting, researching

Week 8 – Midpoint

Theme: Turning Points
Skills: Using perspective, predicting, drawing (maps), research

Week 9 – Wildlife

Theme: Adaptation & Interconnectedness
Skills: Brainstorming, graphing, identifying cause and effect, calculating, research

Week 10 – Decision-Making

Theme: Making Decisions
Skills: Making decisions, reading maps, collecting data

Week 11 – Forces of Nature

Theme: Natural Forces
Skills: Collaborating, mapping, research

Week 12– Fisheries Depletion

Theme: Sustainability
Skills: Calculating, predicting, researching, graphing

Week 13 – Teamwork & Perseverance

Theme: The Team's Commitment
Skills: Making decisions, collaborating, showing respect, researching

Lesson Plan Outline

Week 14 – What I'll Miss

Theme: Perspective
Skills: Graphing, map reading, averaging, narrative writing

Week 15 – Defining Success

Theme: Defining Success
Skills: Mapping, drama, creative expression, setting goals, planning, making decisions, writing

Extra – Getting Ready

Theme: Defining Success
Skills: Mapping, drama, creative expression, setting goals, planning, making decisions, writing

Lesson Plans

Week 1 – Following Your Dreams

Theme:
Careers & Life Goals

Interdisciplinary Connections:
Geography, History, Math

Skills:
Researching, planning, relating cause and effect, analyzing maps

Key Words:
Transatlantic, circumnavigation, persistence, motivation, polar easterlies, prevailing westerlies, trade winds, Gulf Stream, great circle, horse latitudes, doldrums

Materials

Classroom Activity Computer with Internet access, biographies, magazines focusing on the news, popular culture, sports, or business, set of encyclopedias; **Map/Math Connection:** maps of the Atlantic Ocean and the world (provided), global wind belts, and ocean currents; globe

Introducing the Lesson

Blondie Hasler, a decorated veteran and experienced sailor, had a dream. He believed that he could sail solo across the Atlantic Ocean, from England to America. He thought that a trans-Atlantic race would not only be an exciting sports event, but would stimulate the development of new gear and tactics that would ultimately make sailing safer and easier for everyone. Most experienced sailors scoffed at the idea. No one, they thought, could endure the lengthy solo voyage across the tempestuous North Atlantic, with its icy seas and the constant threat of storms and icebergs, all the while sailing against prevailing winds and currents, and catching just a few hours of sleep each day. However, due to Hasler's persistence, his dream became a reality. Hasler and four others completed the first trans-Atlantic, single-handed race in 1960.

Others have had similar dreams. In the early 1500s, Magellan sought to discover a southwest passage around the Americas to the Orient. More recently, people dreamed of sailing around the world single-handedly, without stopping or assistance. Sir Robin Knox-Johnston became the first to achieve that in 1969. Then, in 1989, Frenchman Philippe Jeantot founded a race for those who wished to follow in the footsteps of Magellan, Hasler, Knox-Johnston, and other great pioneers of sailing. Successful people are often driven by lofty dreams. In this lesson, students will research the dreams of a well-known person and draw lessons for themselves.

Classroom Activity

Write several topics of potential interest to students on the board, such as Music, Literature, Art, Sports, Science & Technology, Politics, Travel, Entertainment, and Adventure. Have each student choose one interest area, and set up students in small groups based on their selected area of interest. Have each group brainstorm a list of 5–10 people that they admire in their chosen field. Ask each student to choose one person in their selected field to research. They will develop a short biography of this individual, focusing on what the person has accomplished and how they got there. Provide students with a set of specific questions to answer, such as the following:

> Where and when was your person born? What was his/her family background? Did s/he have a dream or goal that s/he were determined to pursue? If so, how did s/he go about this? What dream or goal would you like to pursue? List some concrete steps that you could take to make this dream come true. Conclude with a class discussion of themes and characteristics shared by many of the chosen individuals. Students should find that determination, creativity, and hard work are common themes.

Week 1 – Following Your Dreams

Map/Math Connection

1. Distribute to each student a copy of the map of the Atlantic Ocean included in this booklet. Have students locate Les Sables d'Olonne, France (where the Vendee Globe race starts) and Boston, Massachusetts, USA (where Rich is from) on the map. Ask students to draw a line showing the shortest distance between these two points.

2. Show students maps of global winds and ocean currents. The global winds map should show the following wind belts: polar easterlies, prevailing westerlies, and trade winds. The ocean currents map should show the Gulf Stream and Labrador Current. Point out that, because of these winds and currents, a straight line might not be the fastest course between the start and finish of the race. In fact, there are at least four possible routes:

   - Rhumb Line route: This route lies between 40 and 50 degrees north latitude and follows the straight line course students have drawn on their map. Note that this does not take into account the curvature of the Earth, and so is not the absolutely shortest route between Plymouth and Boston. This route carries the risk of icebergs and unfavorable winds.

   - Great Circle route: A great circle is the shortest distance between two points on a sphere. Use a globe to demonstrate the difference between the Great Circle and Rhumb line routes. The Great Circle route has a higher risk of icebergs and fog than the Rhumb Line route and requires frequent changes in course due to headwinds.

   - Northern route: This route takes advantage of strong favorable winds and Labrador Current to move at high speeds. However, the route is about 300 miles longer than the Great Circle route. Ships are also at much greater risk of storms and icebergs. Francis Joyon almost won the 1996 race by following this route.

   - Azores route: This route takes advantage of the calmer, more favorable winds to the south, at a latitude of about 36 degrees. The risk of icebergs and fog is greatly reduced. However, this is the longest option, about 600 miles more than the Great Circle route.

Have students consider the advantages and disadvantages of each route in debating which course would be best to follow in a trans-Atlantic race.

Home Connection

Have students research the history of long sailing voyages. How did ships of yesteryear take advantage of global wind belts and currents to sail between Europe and the Americas, and between the Americas and the Orient? What are the horse latitudes and the doldrums, and why did ships try to avoid them? How does the route Rich plans to take compare with those of earlier round-the-world voyages, such as that of Magellan?

Team Project Connection

History Team

Newspaper Connection

Locate a newspaper article that describes a person (or group) that is pursuing his or her dream. Write a summary of the article. What strategy is the person using to reach their goal? Do you think he or she will succeed? Explain why or why not.

Week 2 – Marine Transportation

Theme:
Transportation

Interdisciplinary Connections:
Physical science, engineering, geography, mathematics

Skills:
Predicting, designing and redesigning, mapping, calculating

Key Words:
tanker, floating and sinking, fluid, density, displacement, buoyant force, latitude, longitude, nautical mile, statute mile, knot (speed)

Materials

Classroom Activity tank of water; a variety of objects to demonstrate floating and sinking; tin foil; pennies; pails of water; **Map/Math Connection:** world map with latitude/longitude lines.

Introducing the Lesson

Many everyday objects that students enjoy, including games, electronics, toys, clothing, furniture, etc., are imported from other countries. In addition, much of the food and the energy that we rely on to heat our homes and drive our cars was produced abroad. How do these products reach our homes? In many cases they are brought to major ports, such as Long Beach and New York, by huge cargo ships or tankers. The largest of these ships are more than 1,000 feet long and weigh several hundred thousand tons!

Classroom Activity

In this activity, students will learn about floating and sinking.

1. Ask students to explain their ideas about floating and sinking. Many students may have the misconception that all light objects float and all heavy objects must sink. Challenge students to explain how a heavy object such as ocean tanker can float. *(An object will float in a fluid if the object is less dense than the fluid.)*

2. Use a tank of water and a variety of objects made of different substances, such as corks, pennies, paper clips, rubber stoppers, cans of soda, etc., to demonstrate floating and sinking. For each object, have students predict in advance whether it will float or sink, and then test their predictions in front of the class.

3. Provide each group of students with several square sheets of tin foil, a pile of pennies, and a pail of water. Challenge them to construct a "cargo ship" out of the tin foil that can support the most
pennies without sinking. Encourage them to experiment with at least 3 different designs, making their ships in a variety of shapes to see which shape works best. (Have them use a new piece of foil each time.) Have each group sketch each shape they try, and record their results. Also, have them observe, for a given number of pennies, the height of their "cargo ship" above the water level. Once each group is finished, have groups compare their results and draw conclusions based on the class's experience.

Map/Math Connection

1. A ship's location at sea is measured in degrees of latitude and longitude. Latitude is measured north or south of the equator, which has a latitude of 0 degrees, and longitude is measured east or west of the prime meridian, an imaginary line passing through Greenwich, England. Have students use *Great American III*'s log to track its position throughout the race.

2. Distance at sea is typically measured in nautical miles (nm), rather than the statute miles that we commonly use for measuring distance on land. One nm equals 1 minute of a circle's arc, about 6,076 feet. (There are 60 minutes of arc in a degree, and 360 degrees in a circle.) Speed on ship is typically measured in knots, where one knot equals 1 nm per hour. Have students use the data from Step 1, above, to calculate the distance the *Great American III* has moved in the last day, or week. From this, have student's calculate the ship's average speed, in knots.

Week 2 – Marine Transportation

Home Connection

Find a container of food or a piece of clothing at home that was produced in another country. Find this country on a map, and explain to your family how it likely was transported from that location to your town.

Team Project Connection

None

Newspaper Connection

Locate a newspaper article that focuses on transportation. Explain the type of transportation involved (e.g., ship, rail, automobile, etc.) and what is being transported. How is this type of transportation well suited for this purpose? What alternatives, if any, might be available? How do you think the recent rise in fuel prices has affected this means of transportation?

Week 3 – Equator Crossing

Theme:
Observing Traditions

Interdisciplinary Connections:
Geography, math, history

Skills:
Brainstorming, classification, research

Key Words:
Equator, superstition, tradition, ceremony, cartographer

Materials

Classroom Activity props for role-playing; **Map/Math Connection:** textbooks or other library resources containing pictures of old maps

Introducing the Lesson

A superstition is a belief that runs counter to what a society holds to be true (e.g., don't walk under a ladder, knock on wood for good luck, etc.). Although superstitions may appear to be irrational, they and the actions/ceremonies that accompany them are still present in modern society.

Historically, sailors have always been quite superstitious. During his voyage, Rich will follow a well-known ceremony based on superstition when they get to the equator: the equator-crossing ceremony. The purpose of the ceremony is to be blessed by King Neptune, mythical ruler of the oceans. During the ceremony, sailors typically dress oddly or cover themselves in a variety of unpleasant materials (old food, marine mud, etc.) in an effort to "appease" King Neptune and get his blessing to cross the equator and sail on safely. Discuss the concept of superstition and the equator-crossing ceremony with students.

Classroom Activity

1. As an open discussion, have students list on the chalkboard the superstitions that they may know of or follow.

2. Once all superstitions are listed, have students categorize them. In what area are most uperstitions focused (e.g., sports, hobbies, family, etc.)? Why do students have these superstitions? Do they serve a purpose? What do students think would happen if they did not do as the superstitions require? What famous people do students know who are superstitious?

3. Once students learn about how Rich conducts his equator-crossing ceremony, have them gather materials from home to dress up and conduct their own ceremony, playing the roles of captain and crew of a ship. Do they think that King Neptune would bless them?

Map/Math Connection

1. Explain that a cartographer is a person who designs and makes maps. Historically, cartographers illustrated the world in the way that it was perceived and understood by them at the time. Some maps were practical navigational maps while others "illuminated" the unknown with pictures of sea monsters and other hazards.

2. Have students look through history textbooks and in library resources to find pictures of old maps (local, regional, and world). Then, ask students to answer the following questions:

   - How did the cartographers' perceptions of their world differ from what you know to be true today?
   - What can you learn about people by observing the way in which they represent their world?

Week 3 – Equator Crossing

Home Connection

Families are a place where ceremonies, traditions and superstitions often play an important role. Have students discuss with their families what traditions they follow and why. Are the traditions based in religion? Are they based on "what they have always done?" What is the purpose of the ceremonies, traditions, and superstitions that students' families observe? What would happen, or how would it feel, if they did not observe these traditions?

Team Project Connection

Navigation Team

Newspaper Connection

Find an article or picture in the newspaper that shows or discusses a ceremony (political, religious, or personal). Why is this particular ceremony important? Write a letter to the editor that describes one of your traditions and why it is important to you.

Week 4 – Environment: Water& Air

Theme:
Environmental Resources and Impacts

Interdisciplinary Connections:
Science, social studies, geography, language arts, mathematics

Skills:
Converting fractions and decimal percents, calculating ratios and proportions, making a model, persuasive writing, graphing, reading maps

Key Words:
Environment, pollution, climate, desalinator, ratio, proportion, Likert scale, survey

Materials

Classroom Activity light source(s) (incandescent lamps), clean glass jars (1 quart or 1 liter), paper cups, saltwater solution, food-grade plastic wrap, rubber bands; **Map/Math Connection:** atlases or globe, meter stick, paper, markers

Introducing the Lesson

Ask students to estimate how much water they use during a day. Help them to come to a reasonable estimate by first defining when they use it (remind them of the hidden uses too: laundry, cooking, lawn care, etc.). Emphasize the importance of fresh water to all life. Explain how fresh water and sea water are resources that we often take for granted, and that we tend not to realize their importance until they are polluted.

Great American III has a limited capacity to store water on ship because of limited space. In addition, if too much water is stored, it might add too much weight to the boat and slow it down. Nonetheless, Rich still must use a certain amount of water each day (for drinking, cooking, washing, etc.). So, how do he get enough fresh water? He makes fresh water from sea water by putting it through a process called desalinization. Students can use the following process (distillation) to demonstrate one way in which salt can be removed from water. On *Great American III,* Rich uses a reverse osmosis desalinator (a process that is different from distillation), but the end product is the same: fresh water.

Classroom Activity

1. Separate students into teams of 2–3 students each. Give each team a cup of salt water, a large glass jar, plastic wrap and rubber bands. (Alternatively, you could have the whole class work with one jar.)
2. Have each student taste a small drop of the salt solution and then describe what it tastes like.
3. Next, have each team put their salt water into their jars, then place the plastic wrap tightly around the top of the jar and wrap a rubber band around it to seal it well. Make sure that the salt water does not splash onto the plastic.
4. Place a light source near the base of each jar to heat up the water. If no lamps are available, place the jars on a sunny windowsill. Leave the jars overnight, shutting off the light at the end of the day.
5. The next day, have each team carefully remove the rubber bands and plastic from their jar, then taste the water that has condensed on the plastic. Is it salty? If so, is it as salty as the water in the bottom of the jar? If not, why not?

Week 4 – Environment: Water& Air

Map/Math Connection

1. Ask students what they know about the ratio of land to water on Earth. Illustrate the point by showing them a globe and asking for estimates in either fractions or percents. Show them a meter stick and point out that centimeters are based on 100, as is percentile, so a meter stick can be used to show a percentage ratio of land to water on the Earth.

2. Have students make meter sticks out of paper, then use markers to color code and label the following facts on their paper meter sticks: approximately 71% of the Earth's surface is covered with water; just 4% of this 71% is fresh water.

3. Locate the oceans on the world map and order them by size from largest to smallest (Pacific, Atlantic, Indian, and Arctic). The percentage of water on Earth's surface covered by each ocean is as follows: Pacific: 46%; Atlantic: 23%; Indian: 20.5%; Arctic: 4%.

4. Have students calculate how much of the world's surface is covered by each ocean and mark it on their meter stick (e.g., Pacific Ocean = 0.46 x 0.71 = 33% = 33 centimeters on the meter stick. This number represents the percentage of Earth's surface that is covered by the Pacific Ocean.)

Home Connection

Help students develop an environmental survey to use with their parents and other family members. As a class project, collectively develop statements about local environmental issues that can be responded to in a Likert scale, ranging from "strongly agree" to "strongly disagree." Have students collect, analyze (in the form of histograms, bar graphs or circle graphs), and report the survey data collected from their families. Have students include recommendations from parents about ways to improve and protect the environment.

Team Project Connection

Geography & Environment Team

Newspaper Connection

Editorials are written to capture the reader's attention and evoke an emotional response. Writers make a point and then support the point with factual information. Distribute editorials from local newspapers for students to review, then have students write a guest editorial about water pollution from a point of view related to Ocean Challenge Live! For example, they could write a letter from Rich about the evidence of pollution seen along the journey and the consequences to marine life.

Week 5 – Invisible Places

Theme:
An Understanding of "Place"

Interdisciplinary Connections:
Geography, language arts, social studies, science, math, history

Skills:
Using maps, letter writing, using empathy, orienteering (using a compass), research

Key Words:
Environment, imagine, empathy, compass

Materials

Classroom Activity atlases, maps;
Map/Math Connection: (for demonstration or for each group): compass, aluminum pie pan, styrofoam sheet (2" x 2"), water, bar magnet, sewing needle, tape, small Post-its (labeled: North 0°, East 90°, South 180°, West 270°);
Newspaper Connection: Communications Team Project Guide (provided)

Introducing the Lesson

Ask students if they recall a time when they were away from home for a week or longer without friends or family (e.g., going away to camp or school). Invite them to share their thoughts with a partner and develop a list of some of the things they missed (or imagine they would miss if they were in such a situation). Then, as a class, develop a combined master list of things students would miss in such a situation.

Point out that Rich has been away from home and family for four weeks. What are some of the same "creature comforts" and family activities they he probably missed? How might Rich have used his memories of friends and family to comfort his loneliness? Talk about the meaning of empathy (i.e., imagining what someone else is feeling, thinking, or experiencing; putting yourself in someone else's place and trying to feel his or her feelings inside yourself). Suggest that students write empathetic and encouraging letters to Rich.

Classroom Activity

1. Remind students that Rich Wilson hasn't seen land for four weeks. Invite them to download maps from *Ocean Challenge Live!* of the journey from France to this point. In addition, obtain atlases or maps showing landmasses bordering the route, and have students identify the major countries Rich has passed but not seen.

2. Divide students into small groups and assign each group one of the countries to research. Have students find out about the country's geography, economy, climate, commercial interests, society, and culture.

3. Have groups do oral reports or brief Powerpoint presentations about the land and people they studied. Guide students to write about what they have learned.

Week 5 – Invisible Places

Map/Math Connection

1. Explain that early navigators used floating compasses to determine direction and to maintain the course of their ships. Elicit what mechanisms the earliest mariners used to navigate prior to the invention of the magnetic compass (i.e., they sailed close to shorelines and used telescopes if they went too far off shore).

2. The earliest compasses were invented by the Chinese in the 12th century. The use of floating compasses was prevalent in European navigation by the 15th century. Guide students to make a floating compass model similar to those used in early navigation, following the steps below:

   - Pour water a centimeter deep in an aluminum pie pan.
   - Next, cut a styrofoam square 2 inches on each side.
   - Magnetize a sewing needle by stroking the needle point several times against the north pole of a bar magnet. Each stroke must be in one direction only.
   - Tape the magnetized needle diagonally onto the piece of foam, and then float it gently in the center of the pan.
   - On the pan, label the direction that the needle points "North 0°." Label the corresponding major compass points (East 90°, South 180°, West 270°) around the edge of the pan. You may also wish to add NE, NW, SW, and SE. Use a standard compass to check for accuracy. If it does not correspond, see if other metallic objects are interacting with the magnetized needle.

Home Connection

Have students work with their parents to determine what information they would want to share with other peoples to create an understanding of what makes the students' country "home."

Team Project Connection

Energy & Mechanics Team

Newspaper Connection

Use the Communications Team Project Guide as a class project. Have students search the newspaper to identify news of interest to Rich aboard the *Great American III*, and write a news digest for him. Organize the project so that students work in teams on different sections of the newspaper.

Week 6 – Antarctica

Theme:
International cooperation

Interdisciplinary Connections:
History, Geography, Politics, Science

Skills:
Research, relating cause and effect, analyzing maps

Key Words:
Continent, glacier, desert, consumer, producer, predator, food chain, food web, expedition, treaty, consensus, diplomacy

Materials

Classroom Activity and **Map/Math Connection:** access to Internet or library resources for research; map of Antarctica.

Introducing the Lesson

Much of the Vendée Globe race will take place in the frigid ocean waters near Antarctica, providing a great opportunity for students to learn more about Earth's least-known continent. Antarctica, with an area of some 14 million km2, is nearly 1.5 times the size of the U.S. It is the coldest, windiest, driest, and highest (on average) continent. There is little precipitation, except along the coasts, and the interior is considered the world's largest desert. Average temperatures in summer vary from about -31°F to -5°F (-35°C to -15°C) in summer to about -94°F to -40°F (-70°C to -40°C) in winter. About 98 percent of Antarctica's surface is covered by ice. The ice is, on average, around 1.6 km thick.

There is no permanent human population on Antarctica, and native life forms are limited to hardy species that are well adapted to the cold, such as penguins. 28 countries operate a set of permanent or seasonal research stations on the continent. The population of these stations varies, from around 1,000 in winter to upwards of 4,000 in summer.

Seven countries, namely Argentina, Australia, Chile, France, Great Britain, New Zealand, and Norway, have staked claims to portions of Antarctica. However, these claims are not widely accepted. Practically, Antarctica is managed jointly under the auspices of the Antarctic Treaty, which was signed in 1959 and went into effect in 1961. Under the terms of the Treaty, decisions are made by consensus (not by vote.) These decisions are then implemented by individual member nations. Among the terms of the treaty is that Antarctica is to be used only for peaceful purposes and that freedom of scientific investigation is permitted throughout the continent. More recently, a host of environmental measures were adopted under the Treaty.

Classroom Activity

When students think of organisms that live in Antarctica and the surrounding seas, they may think mainly of penguins and perhaps seals. The reality is much more complex. Phytoplankton and algae are tiny plants that are the major producers of the Antarctic region. Krill are small shrimp-like animals that serve as a major food source for ocean animal life. There about 100 species of fish and 35 species of squid that swim in Antarctic waters. Penguins feed on fish and krill, and are preyed upon by seals and orca. There are also a variety of seabirds and whales that inhabit the region, including the giant blue whale, the largest animal on Earth. Life on land is sparse, with a few species of hardy mosses, lichen, fungi, and insects, as well as bacteria and animals such as penguins and seals that gather food from the sea.

Have groups of students construct a set of class cards for organisms that live in and around Antarctica. Have students sketch their assigned organism and record basic information, including what it consumes and any predators it may have. Then help students to construct a food web, connecting different organisms/cards with arrows or string. Conclude with a discussion of how the Antarctic food web is similar to and different from a food web for the area in which you live.

Week 6 – Antarctica

Map/Math Connection

1. Have students find a map of Antarctica on the Internet and print it out for use in this activity. Have students use Internet or library resources to identify and locate the South Pole and major research stations, seas, and ice shelves on the map. Explain that ice shelves are large regions of floating ice, and comprise about 11 percent of the continent's area.

2. Have students work in teams to research and prepare brief presentations about the major historical expeditions to Antarctica, including those of James Ross, Robert Scott, Ernest Shackelton, Roald Amundsen, and Richard Byrd. Have them answer such questions as: What was the purpose of the expedition? What route did it follow? What discoveries were made? Have students trace their expedition's route on a class map or the blackboard.

3. Have a class discussion about the ozone hole over Antarctica. How did this "hole" form, and what are its effects? How has its size changed over time? What agreement have nations reached to try to ameliorate this problem?

Home Connection

People in families may have different goals and interests, just as different nations do. Have students describe some ways in which family disputes can be resolved. Ask them to give examples from their own experience. How are these similar to, and different from, the ways in which nations resolve disputes?

Team Project Connection

None

Newspaper Connection

Find a newspaper article that focuses on international cooperation or negotiations. Possible topics include trade, climate, natural resources, space, and endangered species. Write a paragraph describing the scope of the issue. Who are the parties? What are the major points of contention? What are the benefits of cooperation? Was an agreement reached, or is one likely to be reached?

Week 7 – Climate Change

Theme:
Change over time

Interdisciplinary Connections:
Physical science, Earth science, meteorology, mathematics

Skills:
Conducting a controlled experiment, graphing, predicting, researching

Key Words:
climate, global warming, carbon dioxide, greenhouse gases, greenhouse effect, fossil fuels, combustion, infrared radiation, carbon cycle, carbon footprint

Materials

Classroom Activity 2 plastic bottles, heat lamp, 2 thermometers, soil, spray bottle, ruler, plastic wrap, rubber band, scoop, clock, graph paper; **Map/Math Connection:** graph of atmospheric CO_2 levels over approximately the last 150 years, access to Internet or other up-to-date information resources.

Introducing the Lesson

Climate is the range of weather that occurs over large regions over long periods of time. In recent years, many scientists and other citizens have grown increasingly concerned that Earth's climate may be changing as the result of human activities. The most dramatic example of climate change is global warming, an increase in the average temperature of the Earth over time. The major cause of global warming is thought to be increased emissions of carbon dioxide (CO_2) and other greenhouse gases such as methane, primarily from the combustion of fossil fuels such as oil, natural gas, and coal.

The effects of global warming are predicted to be significant and widespread, but are still uncertain and not well understood. One major concern is that higher average temperatures will cause much of the ice on Earth's surface to melt. The Arctic icecap, for example, has become noticeably smaller in recent summers than compared with the past. As the Arctic ice melts, ocean levels would rise, potentially resulting in the flooding of coastal areas. Another predicted effect of global warming is the increasing intensity of extreme weather events, such as hurricanes.

A greenhouse is a good analogy for how CO_2 in the atmosphere acts. The CO_2 in the air is fairly transparent to incoming sunlight, much of which is in the visible and ultraviolet portions of the spectrum. However, much of the incoming light absorbed by Earth's surface is radiated back toward the atmosphere in the form of infrared radiation. The CO_2 in the atmosphere is less transparent to this radiation, in effect trapping it close to Earth's surface. The result is that the atmosphere is be warmer than it would be otherwise. This so-called greenhouse effect has kept Earth warm enough to support life. However, increased CO_2 emissions, mainly from the burning of fossil fuels, now threaten to heat up the atmosphere to warmer levels over time.

Classroom Activity

In this activity, students will conduct a controlled experiment to simulate the greenhouse effect.

1. Before class, cut the top off of 2 clear plastic bottles where the neck begins to narrow.
2. Have students place a scoop of soil in each bottle and tape a thermometer at a fixed height to the side of each bottle. Then have them dampen the soil with water from the spray bottles.
3. Cover one bottle with plastic wrap and secure it with a rubber band. The other bottle will remain uncovered. Set up a heat lamp midway between the two bottles, pointing it directly between them.
4. Have students record the initial temperatures in each bottle, and then temperature readings at 30-second intervals for 15-20 minutes. After all of the data is recorded, have students graph the results for each bottle. Students should find that the temperature of the covered bottle increased faster and remained consistently higher than that of the control bottle.

Week 7 – Climate Change

Map/Math Connection

1. Examine a graph of CO_2 levels in the atmosphere over the last 150 years or so. If current trends continue, predict the level of CO_2 in the year 2050. What actions could people take to alter your prediction?

2. Many other expected effects of global warming have been identified. Use Internet or recent library resources to identify several of these likely effects. How might global warming effect the area in which you live?

Home Connection

Use an on-line calculator to determine your family's "carbon footprint." Think about a few changes that you might make to reduce this footprint, and discuss your findings with your family.

Team Project Connection

None

Newspaper Connection

Locate a newspaper article that discusses some aspect of climate change. What causes or effects of climate change are identified in the article? What evidence is cited? What actions, if any, are being proposed or might be considered to reduce these effects?

Week 8 – Midpoint

Theme:
Turning Points

Interdisciplinary Connections:
Geography, art, technology, language arts

Skills:
Using perspective, predicting, drawing (maps), research

Key Words:
Midpoint, perspective, desalinator, dehydrated food, communications systems

Materials

Classroom Activity *Ocean Challenge Live!* Captain's Log and Journals;
Map/Math Connection: Voyage Route Tracking Map (provided), paper, markers or crayons

Introducing the Lesson

Point out to students that at the midpoint in a journey or challenging experience, people can plan ahead with two different perspectives. They can look back and think of things they would have done differently, or they can look ahead and think of ways they will act differently based on what they have learned during the first part of their journey. Form discussion groups to talk about what students might do differently at this point of the school year based on experiences they have had so far. Collectively share the information in a full-class discussion.

Classroom Activity

1. Organize students into teams. Have each team use the *Ocean Challenge Live!* Captain's Log and Journals to assess the status of the voyage thus far.

2. Have students identify specific voyage achievements as well as challenges, and predict how long it will take *Great American III* to complete the race. Make sure that teams explain the reasoning behind their predictions.

3. Ask each team to list and evaluate the decisions Rich has made, determining which decisions were "wrong" or "right," depending on the result. What determines whether the decision was good or not?

Map/Math Connection

1. Ask students to turn the Voyage Route Tracking Map upside down (i.e., north at the bottom) and view it from that perspective. Ask students if they notice anything different about the route or have different predictions about the next weeks when they see the map from that perspective.

2. Point out that there is no reason why we always put north at the top of maps. Ask students how people would use a compass if, instead of having north as the top of maps, they used south, east, or west as the top.

3. To encourage students to think anew about maps and geography, have them put away the Voyage Route Tracking Map, then draw their own map of the route that the boat will follow for the remainder of the voyage. Have students exchange their maps with their peers, then determine as a group which student's map has the most accurate detail.

Week 8 – Midpoint

Home Connection

Have students interview their parents, grandparents and/or other family members to find out about turning points in their family history. What did they learn from these turning points that helped them to make future decisions? Did they move ahead in different directions or ways? Why or why not?

Team Project Connection

Information Team

Newspaper Connection

Have students search the newspaper for examples of individuals or organizations at a turning point. This could be a sports team, a business that has just issued a quarterly report, or a politician who is just beginning his or her term in government. Ask the students to imagine themselves from the individual or organization's perspective in the same situation. What kinds of things would the people who are at the turning point have to think about from their earlier experience? What goals might they set or change? What kinds of things might they plan ahead for based on that experience? How might they evaluate their success?

Week 9 – Wildlife

Theme:
Adaptation & Interconnectedness

Interdisciplinary Connections:
Science, geography, math

Skills:
Brainstorming, graphing, identifying cause and effect, calculating, researching

Key Words:
Surface zone, algae, food web, habitat, neritic zone, continental shelf, adaptation, predator, prey, camouflage, animal population

Materials

Classroom Activity a variety of colored paper clips, toothpicks, or other small objects of various colors, solid colored paper sheets, paper clip containers, graph paper, colored pencils or markers, stopwatch; **Map/Math Connection:** *Ocean Challenge Live!* Captain's Log

Introducing the Lesson

Have students recall various examples of animal life that have been reported by Rich Wilson aboard the *Great American III.* Many of the most commonly seen marine species are those that either float on the surface, like sea turtles, or jump out of the water, like flying fish or dolphins. These species live in the top layer of the open ocean, a layer known as the surface zone. The surface zone extends to the depth that sunlight reaches, typically less than 200 meters. Most ocean life can be found in this zone because algae, the basis of the ocean food web, requires sunlight to grow.

Along the voyage, the ship will be passing near parts of Africa, South America, and Australia, all of which contain rich land animal habitats. Have students work in groups to research land and marine habitats along the ship's route (e.g., the Amazon rainforest; the African plains and deserts; the Australian Great Barrier Reef and outback, mountains such as Mt. Kilimanjaro and the Andes range; beaches; and ocean habitats such as the neritic zone over the continental shelf and the surface ocean zone). Have students use the following questions to guide their research:

- What are the physical characteristics of the habitat? What are some of the major animal species that live within it?
- What does the local food web look like? Which species are predators and which are prey?
- Find pictures of some animals in the habitat and point out their adaptations. What types of adaptations do these animals have and how do these adaptations help the animals to survive within their habitat? How might these adaptations have originated?
- Find an example of a particular form of adaptation: camouflage. How does camouflage aid an animal's survival?

Classroom Activity

1. Organize students into cooperative groups, then have each group scatter a set of approximately 50 colored paper clips or similar objects on a solid colored sheet of paper. Each paper clip represents prey, with the students playing the role of predators. The sheet should be similar in color to one of the paper clip colors, so that they blend in with the sheet.
2. Once all clips are in place, have groups switch positions so that each group has a different sheet. Have one student in each group act as the "catcher" and another as the "counter." Tell the "catchers" that they can "catch" only one paper clip at a time and may not pick up the sheet. Once a clip is caught, it is handed to the "counter" to be tabulated later. Give each group sufficient time (about 45–60 seconds) to collect about half of the clips sprinkled on the sheet.
3. Once collecting is complete, have each group sort their collected clips by color and make a bar graph of the results.

4. Have students answer the following questions, using their bar graphs for reference.
   a. Who was the predator in this activity? What was the prey?
   b. Which color paper clips were found most easily? Which were most difficult to find?
   c. What does this activity have to do with animal camouflage?
   d. Suppose that the paper clips were a population of real animals of all different colors to begin with. How would the color mix of this population likely change over time because of predation? Explain.
   e. If the color of the background sheet were changed, how might this affect the results?
   f. How do predators adapt to find well-camouflaged prey?
   g. What does this activity reveal about how adaptations appear in animal populations?

Map/Math Connection

1. Explain to students that, on the ocean, distances are measured in nautical miles, while on land, distances are measured in statute miles. The value of a nautical mile is based on the length of one minute of arc on Earth and is also equal to 1.15 statute miles. A knot is a unit measure for speed, equal to one nautical mile per hour.

2. Go to the *Ocean Challenge Live!* Captain's Log. Find out how many nautical miles *Great American III* has traveled since it left France. Based on the number of days the ship has traveled, what is the average number of nautical miles per day the ship has traveled? Make the same calculation to determine the ship's speed in knots.

3. Calculate the distance covered by and the average speed of *Great American III* over the next week. Can you find any relationship between the boat's speed and other information provided in the Captain's Log?

Home Connection

In an earlier voyage on the *Great American II*, Rich Wilson was awed by the connectedness of the ocean's action. "Every salty wave from San Francisco to Boston was connected to the next, and to every harbor, beach and river he passed." To demonstrate the concept of interconnectedness, have students talk with their families about how events, actions, and decisions that occur within the family can have an effect on other family members. How can students' own decisions affect their families and others who care for them? Invite students to share their family discussion.

Team Project Connection

Marine Life Team

Newspaper Connection

The environment is frequently in the news. Have students find newspaper articles that identify problems relating to the environment. Have each group present one problem to the class, then have the class brainstorm possible solutions for the problem.

Week 10 – Decision Making

Theme:
Making Decisions

Interdisciplinary Connections:
Geography, math, science, history

Skills:
Making decisions, reading maps, collecting data

Key Words:
Route, decision, alternative, prevailing winds, aneroid barometer, barometric pressure, millibars

Materials

Classroom Activity *Ocean Challenge Live!* Captain's Log and Ship Position, world atlas, Voyage Route Tracking Map (provided), paper, writing utensils, world history books;
Map/Math Connection: aneroid barometer (optional)

Introducing the Lesson

Point out that daily—in fact hourly—Rich Wilson aboard the *Great American III* must make decisions about which is the best route to take based on wind, weather, sea conditions, and destination. Ask students if they have ever taken a route that was longer than another route but safer or different in some way. Ask them to explain why they chose to take the longer route. Display the following decision-making steps on a chalkboard, bulletin board or overhead projector. Refer to them as students explain their decisions to change routes:

1. What was the problem or decision to be made?
2. What information (facts that created the problem) did students have?
3. What were the alternative solutions?
4. What were the consequences to each alternative solution?
5. Which seemed to be the best choice and why?
6. Which solution did students choose? Was that the best choice? If it was not, how did they deal with the consequences?

Classroom Activity

1. As a class, look at the map that you are using to track the *Great American III* progress. Ask students to analyze the *Ocean Challenge Live!* Ship Position and Captain's Log pages to find instances in which Rich changed his route or course.
2. Have students make a two-column chart on a piece of paper. In one column, ask them to list reasons why Rich might choose a certain route. In the other column, have them list reasons why Rich might avoid a certain route. For example, the crew might choose a route that has consistent prevailing winds and avoid a route that has a lot of storms. Students should base their lists on information gained from the *Ocean Challenge Live!* online materials.
3. Encourage students to study other nautical voyagers, such as Captain Bligh, sailing the *Bounty* to Tahiti in the late 1780s. Other famous voyagers include Charles Darwin, Christopher Columbus, Henry the Navigator and Ferdinand Magellan.

Week 10 – Decision Making

Map/Math Connection

1. Elicit from students why air pressure changes. (Answer: It is caused by changes in air density and elevation.) Explain that detecting and measuring changes in air pressure is useful in predicting weather changes (which in turn can determine whether a ship's captain changes the course of his ship). Areas of high pressure generally bring clear skies and fair weather. Areas of low pressure bring clouds and precipitation.

2. Show students a barometer (optional) and explain that it is an instrument used to measure air pressure, often called barometric pressure. Point out that as temperature rises or elevation increases, the air becomes less dense. Thus, the pressure decreases. As the temperature drops or elevation decreases, the air becomes more dense and the air pressure increases. An aneroid barometer is a tool that responds to and measures air pressure. The *millibar* is a unit of pressure that is related to the actual weight of air pressing on a square centimeter. *Inches of mercury (in Hg)* is another common unit of measure for air pressure.

3. As the pressure increases or decreases at sea level, Skipper Rich Wilson uses his barometer to predict changes in weather. Invite the Weather Team to present the air pressure data over the past week to determine if the barometric pressure reading was a good predictor of weather conditions and changes.

4. Have students collect barometric pressure readings for the next two weeks and use the data to predict weather changes.

Home Connection

With their parents' help, have students examine a map that they have used to go on a vacation or to visit a friend or relative, then plan several different routes that could take them to the same place. Discuss and record the advantages and disadvantages of each route, then ask parents to discuss why they chose to follow a certain route. Invite students to share their family discussion and map with the class.

Team Project Connection

Weather Team (Invite this team to share information about the ship's air pressure data in the Map/Math Connection activity.)

Newspaper Connection

Have students find examples of decision-making in the paper. Ask each student to find a person whose decision has been reported in the newspaper. Include cartoon characters, if desired. Encourage students to go through the decision-making method suggested in *Introducing the Lesson.* Ask students to identify the factors that affected the choice that person made. Was the outcome what the decision-maker anticipated?

Week 11 – Forces of Nature

Theme:
Natural Forces

Interdisciplinary Connections:
Science, geography

Skills:
Collaborating, mapping, research

Key Words:
Ocean wave, wind, current, typhoon, tsunami, volcano, earthquake, global wind, Coriolis effect, hurricane, tornado, latitude, longitude, Ring of Fire, tectonic plate

Materials

Classroom Activity world map of ocean currents, Voyage Route Tracking Map (provided); **Map/Math Connection:** world map with lines of latitude and longitude (you can use the Voyage Route Tracking Map, if you prefer), list of earthquakes and/or volcanoes with locations

Introducing the Lesson

On his small boat, Rich Wilson is to a great extent at the mercy of the forces of nature. The boat is buffeted by waves and blown about by strong winds. Some of these forces, such as winds and ocean currents, are fairly predictable. Other forces, such as major storms, are not as predictable (at least, not without the help of specialized meteorologists). On the voyage, the boat will be passing near locations where extreme displays of natural forces have appeared in the past. These include the sites of several major volcanic eruptions. Tambora (1815) and Krakatoa (1883), both in Indonesia, are the two deadliest known volcanic eruptions in history. Besides volcanoes, earthquakes are also fairly common in this region of Southeast Asia.

Invite student groups (3–4 students per group) to research the following questions and then report their findings to the class:

1. What are global winds? How will these help or hinder the voyage?
2. What causes currents? What affect do they have on climate?
3. What is the Coriolis effect? How does it affect global wind patterns and currents?
4. How do tsunamis develop? How large can they become? How common are they? How do they affect ocean ships as they pass by?
5. What are the three major types of volcanoes? How are they different? What volcanoes will the boat be passing near?
6. What causes earthquakes? Can they be predicted? Where do they occur?
7. How and where do hurricanes (called typhoons in the Pacific) develop? Is the boat likely to face such storms? What happens to hurricanes once they reach land?
8. What are tornadoes? Can they occur over the ocean?

Classroom Activity

1. Have students examine a map of ocean surface currents. Have them look for patterns in the direction of these currents. They should notice that major currents rotate to the right (clockwise) in the Northern Hemisphere and to the left (counterclockwise) in the Southern Hemisphere. They should also notice that currents tend to flow along the coasts of continents.

2. Have students compare the ocean current map to the Voyage Route Tracking Map. In which areas did the ocean currents move in the same direction as the boat traveled? In which areas did the boat sail against prevailing currents? How do you think the direction of currents affects the speed at which a boat moves? Does the *Great American III*'s route make sense in light of the currents? If Rich has to sail against the current at times, how might he accomplish this?

Week 11 – Forces of Nature

Map/Math Connection

1. Obtain a list of 20–30 major earthquakes or volcanoes, together with their locations (latitude and longitude), then have students plot them on a world map.
2. When done, ask students to study their maps. Do they see any patterns in the plotted earthquakes and volcanoes?
3. As a class, discuss the geographic patterns of earthquakes and volcanoes. For example, most earthquakes and volcanoes tend to cluster together, especially around the rim of the Pacific Ocean, an area called the "Ring of Fire." This is because the Earth's crust and upper mantle are divided into a series of tectonic plates, which slowly slide horizontally along the surface. Most major earthquakes and volcanoes are found near where such plates meet.

Home Connection

Lead a discussion on earthquake safety. Inform students about proper actions to take in the event of an earthquake, such as taking cover under a desk, table, or doorway. Have students discuss with family members how they could make their home safer before an earthquake occurs. Have them conduct an earthquake hazard hunt in their home, then make any changes (such as moving or fastening down heavy objects that could fall during an earthquake) that the family decides are appropriate.

Team Project Connection

No team presentation this week. Use extra time as a "catch-up" period.

Newspaper Connection

Search the national and world news sections of the newspaper to find articles describing events caused by forces of nature. Possible examples include hurricanes, blizzards, tornadoes, floods, earthquakes, and volcanic eruptions. Locate each of these events on a world map.

Week 12 – Fisheries Depletion

Theme:
Sustainability

Interdisciplinary Connections:
Environment, Mathematics, Science, Economics

Skills:
Calculating, predicting, researching, graphing

Key Words:
Population, resource, nonrenewable, renewable, depletion, maximum sustainable yield, sustainability

Materials

Classroom Activity 40 pennies/paper clips/group, graph paper;
Map/Math Connection: access to Internet or library resources for research; graph paper.

Introducing the Lesson

Commercial fishing employs millions of people worldwide, and fish provide an important source of nutrition for nearly everyone. Sophisticated technology has made it possible to use satellites to find schools of fish, to use lines and nets that are miles long, and to stay out in the open sea for months at a time. As a result, total worldwide fish and shellfish catch has risen at an average rate of around 8 percent per year over the past 40 years.

This substantial increase in fishing has caused the populations of many species of fish to decline precipitously. A recent international study concluded that roughly one-third of fish populations have collapsed to less than 10 percent of their previous size. The study also predicted that if present trends hold, all fish populations would collapse within the next 50 years. Moreover, the overfishing of certain species, such as sharks, has damaged entire marine ecosystems as populations of other species get out of whack.

Unlike nonrenewable resources such as oil and coal, fisheries are a renewable resource. That is, if not subjected to overfishing, fisheries will naturally replenish themselves over time. Thus, scientists and policymakers are increasingly focused on determining the maximum sustainable yield of fish populations, that is the amount of a particular species that can be safely caught over an indefinite period while maintaining its population.

Classroom Activity

In this activity, students will simulate changes in the population of fishes, and learn how to estimate the population's maximum sustainable yield.

1. Divide students into small groups and provide each group with about 40 "fish." (Pennies or paper clips can be used to represent fish.) Tell them to count out 20 fish, and to leave the others to the side for now.

2. Have each group construct a data table with 2 columns, "Year" and "Population." In the first row, have them write "1" and "20" to represent the initial conditions.

3. Explain that each year, the population of fish changes. A certain percentage of fish are caught or die from natural causes. In addition, some of the remaining fish reproduce. As an example, assume 10% of the fish are caught and an additional 10% die from natural causes, and half of the remaining population (assuming half of the population is female) will have one offspring. Have students calculate the resultant population in Year 2. In this case, 16 fish will survive, 8 will reproduce, and a population of 24 (16 + 8) fish will be present in Year 2. Continue to apply the same assumptions through Year 5. Have the students record the data for each year, and then graph the five years of data at the end.

4. Tell students that the demand for fish has increased, and more fish must be caught. Ask them to predict the percentage of fish that can be caught each year while maintaining a stable population. Assign different assumptions for the percentage of fish to be caught to each group. Have groups repeat step 3 for 5 years, and record their data. Remind students not to forget to include the percentage of fish that die from natural causes in their calculations.

Week 12 – Fisheries Depletion

Classroom Activity (Continued)

5. Have each group post its results/draw its graph on the board. Compare the results. What is the maximum sustainable yield for this population? (About 20% caught)

Map/Math Connection

Assign a major marine species to each student group. Have students use the Internet and/or other up-to-date information resources to gather information on the species' population status and how it has changed over time. Have them construct graphs showing population versus time. Also have them describe current issues and possible solutions to creating a sustainable population.

Home Connection

The populations of some popular species of marine fish, such as swordfish, are becoming rapidly depleted. Have students research the status of the main types of fish that their family enjoys eating. If they find any that are being seriously depleted, have them search for possible alternatives that are recommended by conservation groups and discuss their findings with their families.

Team Project Connection

None

Newspaper Connection

Locate a newspaper article that focuses on a particular natural resource (either a living resource such as fish or a non-living one such as energy.) Is the resource in question renewable or nonrenewable? Are supplies currently abundant, or is the resource becoming increasingly scarce? What is being done, or could be done, to make use of the resource more sustainable?

Week 13 – Teamwork & Perseverance

Theme:
The Team's Commitment

Interdisciplinary Connections:
History, science, geography, language arts

Skills:
Making decisions, collaborating, showing respect, research

Key Words:
Cooperation, challenge, commitment, perseverance, decision, tolerance, motivation

Materials

Classroom Activity and **Map/Math Connection:** online materials

Introducing the Lesson

Ask students to recall a situation in which they, with another person or group, kept working toward a goal, even though it was a difficult goal to achieve. This might have been a team sporting competition, a school or community project, or a family challenge. Ask why the four elements—*cooperation, tolerance, commitment, and perseverance*—are important to the success of a project or challenge. [Note: This could be done in a Think, Pair, Share format in which students first *think* and respond in writing to suggested questions; pair with another student to discuss responses; then *share* their responses to the class.] Point out that personal motivation and a commitment to achieving the goal is the reason Rich Wilson persists in his efforts.

Discuss problems that might occur because Rich is sailing alone and does not have anyone immediately available to help him. After being at sea for several weeks, what do you think could happen to Rich's level of commitment? What are some constructive ways he could handle loneliness and his feelings about his commitment to the race? Suppose Rich's extended team (shore-based communications and technical teams, family, and friends) did not share the cooperation, tolerance, commitment, and perseverance that Rich maintains. How might this put Rich at risk?

Classroom Activity

1. Have students review and share the information they have learned and gathered so far about the trip. What are some of the challenges that Rich has faced? How did he persist to meet these challenges?

2. Encourage students to identify some problem-solving events in the voyage, then evaluate Rich's decisions about them. As a class, create a list of the lessons Rich may have learned his decisions.

Map/Math Connection

1. Have students predict challenges that Rich might face during the next few weeks based on his
current location and the weather along his voyage's route.

2. Estimate the time at which Rich will encounter these challenges. Contrast the things that will be *out of his control* with those that will be u*nder his control.* How can Rich accept or deal with things that are out of his control?

3. Find out about the near catastrophe Rich Wilson experienced in his first attempt to sail from San Francisco to Boston, USA, on the *Great American.* Information about this attempt can be found in the *Ocean Challenge/Racing a Ghost Ship Archives* on the sitesALIVE! website.

Week 13 – Teamwork & Perseverance

Home Connection

Have students interview their parents, grandparents, or other adult family members to find out about the daily challenges they face. These could be health, economy, work or family-related. How do they overcome these challenges? Are *cooperation, tolerance, commitment, and perseverance* a part of their solutions to problems?

Team Project Connection

Teamwork Team

Newspaper Connection

Have students look in the sports section (or sections containing other potentially high-risk events) for examples of decision-making that led to a loss. Ask them to imagine (or role-play) the dialogue that took place before each decision. Invite students to imagine or stage the dialogue that took place after the decision that led to the loss. If the role-play involves a sporting-event loss, discuss how using good sportsmanship might help the team.

Week 14 – What I'll Miss

Theme:
Perspective

Interdisciplinary Connections:
Math, geography, language arts

Skills:
Graphing, map reading, averaging, narrative writing

Key Words:
Continent, glacier, desert, consumer, producer, predator, food chain, food web, expedition, treaty, consensus, diplomacy

Materials

Classroom Activity and **Map/Math Connection:** *Ocean Challenge Live!* Captain's Log;
Map/Math Connection: world atlas, Voyage Route Tracking Map (provided)

Introducing the Lesson

Organize students into their project teams. Have each team list the most important events of the voyage, then prioritize the list and determine which are the top two most significant events. Have each team report to the class on why they chose those particular events as most significant. Finally, have the class vote on the two most significant events, then display the results on a bar graph (based on which events were voted for and how many times they were voted for).

Classroom Activity

1. As a class, discuss how perspectives change after people experience an exciting or high-risk event. In what ways might Rich have a different perspective now that he has almost finished his trip and reached his goal?

2. Have students review the Captain's Log to determine what lessons Rich may have learned during the trip.

Map/Math Connection

1. Use the *Ocean Challenge Live!* Captain's Log to determine the distance sailed so far and the distance remaining. Have students predict the elapsed time for Rich to complete his voyage.

2. Have students calculate the hourly rate at which *Great American III* has traveled in the past week. Study the remaining distance that the boat needs to travel to France, and predict the actual day and hour that *Great American III* will arrive. Create a contest to see whose prediction is the most accurate one.

Home Connection

Survey family members about their choices of the most significant events of the voyage. Find out if parents agree with students' choices of significant events. Collect and compare parent data with class data. Find out how (if at all) parents' perspectives differ from students' perspectives. Why do you think a difference exists?

Team Project Connection

Communications Team

Week 14 – What I'll Miss

Newspaper Connection

Explain that a narrative is a way of telling the story of an event from beginning to end. A good narrative:

- captures the reader's attention in the introduction
- follows a logical sequence of events
- evokes an emotional response from the reader
- provides the reader with new information or a unique perspective on old information
- employs an appropriate tone or voice for the subject

Have students find narratives in the newspaper (e.g., in the features or op-ed sections), then ask them what they noticed about the kinds of information the reporter included. Have students write a narrative of some of the exciting events that have occurred so far during Great American III's journey. They may divide the narrative into parts and write the complete event as a team. Instruct students to write their narratives in one of the newspaper writing styles they have encountered.

Week 15 – Defining Success

Theme:
Defining Success

Interdisciplinary Connections:
Geography, art, math, language arts, humanities

Skills:
Mapping, drama, creative expression, setting goals, planning, making decisions, writing

Key Words:
Success, skills, achievement, resilient, procrastinate, self-esteem

Materials

Map/Math Connection: Voyage Route Tracking Map (provided), large sheets of paper or posterboard, markers, crayons, pens or pencils

Introducing the Lesson

Have students review their notes about the journey. Remind them that at the beginning of the voyage there was no guarantee that Rich Wilson would achieve his goal. Have students define success (what does success mean to them?). Did Rich Wilson win the race? If so, was his success limited only to winning? If not, could his voyage still be considered successful? As they review online materials, have students document and describe any instances that they would qualify as successful. What lessons were learned from mishaps or failures? Ask students what factors they think were most important in enabling Rich to succeed and arrive at his destination.

Classroom Activity

1. First, have students identify people they believe are successful. These people might include classmates, teachers, family members, sports figures, politicians, etc.

2. Next, ask students: What are some actions or qualities a person needs to do/have to be successful? Some possible answers might include: being responsible, setting realistic goals, devising a plan to reach goals, managing time, being committed, and remaining resilient. Point out that goals need to be challenging but realistic.

3. Have students discuss some of the pitfalls that hamper achieving success, such as procrastination, fear of failure, and poor planning. Write the term resilient on the chalkboard. Elicit a definition and examples of resiliency. Stress that being resilient means being able to recover from an event that could be disappointing or catastrophic.

4. As a class, discuss how some of the following things can help a person define and achieve success for themselves:
   a. make a checklist and check off the smaller steps as they are achieved
   b. reward oneself when a goal has been achieved
   c. ask for help when it is needed
   d. find someone who has a similar goal and exchange encouragement, ideas, and lessons learned
   e. once the goal is accomplished, reflect on the processes that were most important to success

5. Discuss the actions/qualities that Rich Wilson demonstrated in setting and achieving his goal. How do students think that Rich used the five suggestions to achieve his goal?

Week 15 – Defining Success

Map/Math Connection

1. Have students make a large annotated route map, using the Voyage Route Tracking Map for reference.
2. Have students write "headlines" at specific locations along the route where significant events occurred.

Home Connection

Have students make a scrapbook of the materials they produced during the voyage. It may be based on events, chronology, etc. Include photos, quotes, and captions downloaded from *Ocean Challenge Live!* on the sitesALIVE! website. Encourage students to focus on a theme such as teamwork, success, marine life, decision-making, record-breaking, etc.

Team Project Connection

The Book & Movie Team can act out the final scene of their film. Have a member of each of the other Team Projects present their own brief summary of the voyage from their particular perspective.

Newspaper Connection

Have students look through the newspaper for examples of people who have overcome challenges. Was the challenge mental, physical, emotional, or social? How did overcoming the challenge affect the person and those who cared about him or her? Are there any comparisons that can be made between how the person overcame his or her challenge and how Rich Wilson overcame his? Ask students to read the newspaper articles carefully to identify factors that have enabled the described individual to succeed.

Special Final Newspaper Project

Have students prepare a "Special Edition" newspaper to celebrate the completion of the *Great American III*'s journey and their own work. The Special Edition should include the following components:

- **Front Page:** Headline and main feature story. Students could add in related "side-bar" articles, including quotes from the daily audio updates or interviews with members of the class who have become "experts" about specific aspects of the journey.
- **Features:** Articles about different aspects of the journey. Each team could submit an article relating to the focus of their team project.
- **Perspectives:** Editorials and an editorial cartoon about the meaning and/or purpose of *Ocean Challenge Live!*.
- **Challenge:** Math problems, science connections, or trivia questions based on materials generated during the voyage. For example, a crossword puzzle could be developed focusing on nautical terms used in *Ocean Challenge Live!*.

Extra – Getting Ready

Theme:
Vision and Motivation

Interdisciplinary Connections:
Science, math, history, architecture, geography

Skills:
Designing a model, calculating speed, mapping, using a log, research

Key Words:
Vision, motivation, clipper ship, visualize

Materials

Classroom Activity glue, large toothpicks or thin dowels, scissors, flat styrofoam plates, styrofoam bowls, wallpaper water trough, electric fan, stopwatch;
Map/Math Connection: Voyage Route Tracking Map (provided), Ocean Challenge Live! Captain's Log

Introducing the Lesson

Ask students to recall a difficult trip that they, friends, or family members have made. Point out that it is easy to dream of making a difficult trip or taking on a challenge, but to actually meet that challenge is a completely different matter. Ask the students to put themselves in the shoes of Rich on the *Great American III.* What might motivate him to take on such a high-risk adventure as sailing around the world alone? Invite students to suggest some rewards (tangible, social, personal) that Rich might visualize. Ask students to predict the kinds of situations Rich might encounter and the fears he might have to overcome while on his journey. What types and quantities of supplies would he need to bring along with him to last around 100 days on board without ever coming to shore? Have students work with a partner first, then share with the class a list of things they would want to pack on their ship.

Classroom Activity

1. Have students research the topic of sailboats. Some questions to research might include:
   - When were sailboats first used?
   - What principles of physics make sailboats sail?
   - What structural designs are considered when designing a sailboat?
   - What are difference(s) in the design of a racing yacht and a cruising yacht?
   - What special considerations must be made when designing a sailboat for single-handed (solo) sailing?

2. Have students study the design of the monohull *Great American III* from its picture on the sitesALIVE! website and from the schematics contained in the Resources section of this Teacher's Guide. Then, group students in teams of 2–4 to design and build a model of *Great American III* from toothpicks, wood dowels, and styrofoam plates. Determine the specifications for students' boat models (including overall length, width, and height) ahead of time so that during the subsequent race, the ships compete as evenly as possible. Put a time limit on the design and building process.

3. Have a monohull race! Set up the wallpaper water trough as the "race course," and the electric fan at one end as the "wind." Be sure, as student teams race their models, that the water level, angle, fan speed and starting and finishing points remain constant. Use the stopwatch to calculate speed per second.

4. Conclude the activity by having a class discussion about the structural differences of the faster and slower boats.

Extra – Getting Ready

Map/Math Connection

1. Review the concepts of latitude and longitude. Explain that on a globe or map, lines of latitude are imaginary lines around the Earth that are drawn parallel to the equator. Lines of longitude are imaginary lines running north and south around the Earth. Latitude is measured in degrees north or south of the equator and longitude is measured in degrees east and west of the Prime Meridian. These lines are used, in part, to allow ships at sea to know where they are located.

2. Using the concepts of latitude and longitude and the mathematical skills that accompany them, have students track *Great American III*'s location throughout the voyage. Consult the Captain's Log on a daily basis and plot the boat's position on the Voyage Route Tracking Map according to its latitude and longitude coordinates.

Home Connection

With the help of a parent or other family member, have students plan a three-week-long journey to a remote area where there are no modern conveniences (plumbing facilities, refrigeration, grocery/supply stores, housing/hotels, etc.). Have students select the season in which they plan to visit the area, then make a list of items (food, gear, and personal supplies) that will be necessary for their journey. Have students share their list of "essentials." How do these compare to what Rich Wilson is taking with him aboard the *Great American III*?

Team Project Connection

Nutrition and Health Team

Newspaper Connection

Have students compare and contrast the terms "motivation" and "vision." Can a person have a vision and no motivation or vice versa? Ask students to read the *Purpose of Ocean Challenge Live!* in the Teacher's Guide Introduction. Next, have students review the "help wanted" section of a newspaper, then write an employment advertisement for an individual who would be qualified to undertake the *Ocean Challenge Live!* project. Compare the students' advertisement with Rich's qualifications, as outlined in his biography.

History Team Project Guide

Your challenge is to research the histories of the countries along the route that *Great American III* sails. For your sources, use world history textbooks, encyclopedias, the sitesALIVE! website, CD-ROMs, etc.

1. Start by researching and summarizing the voyages of some famous sailors who have challenged the ocean. Include information on the following:

   a. Hernando de Soto
   b. Hernán Cortés
   c. Vasco Nuñez de Balboa
   d. Juan Ponce de León
   e. Christopher Columbus
   f. Captain James Cook

2. Find out about the history of commerce and trade routes in the regions through which *Great American III* will pass.

3. For each country along the way, make a "History Connections" digest. Include information about explorers and navigators who have met challenges in that country. Follow this outline in your reports:

   a. Country:
   b. Explorer/Navigator:
   c. Challenge the person faced there:
   d. How that person met the challenge:
   e. Connections to *Ocean Challenge Live!*:
   f. How does the explorer's challenge compare to that of Rich Wilson aboard the *Great American III*?
   g. What advice might this explorer have for Rich Wilson?

Added Challenge

How is traveling in space like traveling on *Great American III*?
What lessons might Skipper Wilson have for future travelers in outer space?

Navigation Team Project Guide

Your challenge is to create a Location Report. Use the chart below to weekly record the position (location) of the boat and its distance to the nearest landmass. In addition, predict the boat's position one week from the current report and calculate the average weekly distance traveled.

Week	Latitude Longitude	Distance/Direction to Nearest Land	Average Weekly Distance	Predicted Position for Next Week
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Added Challenge

Your predictions should improve each week as you learn more about the voyage. What kinds of things help you to make better predictions about the location of the boat? Calculate the average speed Great American II must travel to break Sea Witch's record of 74 days, 14 hours. The total distance is approximately 15,000 miles.

Geography and Evironment Team Project Guide

Your challenge is to describe the countries and global regions that *Great American III* is passing, and the environmental issues facing these regions.

Week	Nearest Country/Region	Description of the Region	Environmental Issues of the Region
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

Added Challenge

Research one environmental issue further to see if the problem exists in other parts of the world.

Energy and Mechanics Team Project Guide

Your challenge is to both research the basic physical setup of the boat and monitor the use of energy during the trip.

1. The Physics of a Monohull Ship: What is a monohull and why is it built the way it is? To answer these questions, you need a picture of such a boat (found on the sitesALIVE! website), a list of its parts, and an understanding of sailing. You may also find information about monohulls and other sailing vessels from the essays, journals, and questions and answers on the website.

a. To find out further about sailboats, there are several options:

- Call a boat dealer if you have one in your area. If you cannot find a boat dealer, then contact a boat manufacturer. How will you find such a business? Use the yellow pages from a seaport such as New York, Boston, etc.
- Get a model of a sailboat from a hobby store and put it together. In this way, you will get to know the parts of a sailboat firsthand.
- Conduct an interview with someone who has sailed a boat.

b. To report your information, create a key for a picture of a monohull. For each labeled part, tell how it works and why it is important to the boat (Hint: you can use the boat diagrams on the sitesALIVE! website).

c. Find out and list the advantages and disadvantages of sailing monohulls (boats with one hull) and multihulls (boats with more than one hull, e.g., a trimaran).

d. Make a list of tools that should be included in an onboard toolbox to keep the sailboat in good repair. Remember that there is a limit on space and weight on board.

2. Energy Advisors: It is your job to give Rich advice on his use of electricity. First, research the variety and amount of equipment presently aboard *Great American III* (listed on the sitesALIVE! website). Then, contact your local electric company for information about the use of electrical power for this equipment.

a. Make a list of the equipment on the boat that will require electricity.

b. Make a general list of suggested ways that the *Great American III* crew can conserve electricity.

c. Make a list of ways the boat generates electricity (using the sun, wind, and boat's engine), and then find out more about these three methods of getting energy.

d. Keep a voyage energy log, using the table on the following page. Note any problems that cause the ship to use extra energy.

Week	Extra Energy Use Country/Region	How Serious is the Extra Use?	Your Advice About This Situation
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

Added Challenge

Set up an experiment in the classroom to determine how long different voltage batteries will power a light, and graph the results.

Information Team Project Guide

Your challenge is to update the following chart weekly. You can set up the chart on a bulletin board, if you prefer.

Week	Focus of Weekly Report	Significant Happenings from Daily Audio Updates	Special Events and Info
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

Added Challenge

At the end of the trip, decide which week was the most challenging.

Weather Team Project Guide

As the "official" weather forecasting bureau, your challenge is to complete this chart and determine how the weather has affected the ship's progress as the trip proceeds. You can base your predictions on climate information available in an atlas. Each week, compare your predictions to actual weather conditions reported in the Ocean Challenge Live! Captain's Log.

Week		Air Temperature	Sea Temperature	Wind Speed/ Direction	Rainfall
1.	Prediction				
	Actual				
2.	Prediction				
	Actual				
3.	Prediction				
	Actual				
4.	Prediction				
	Actual				
5.	Prediction				
	Actual				
6.	Prediction				
	Actual				
7.	Prediction				
	Actual				
8.	Prediction				
	Actual				
9.	Prediction				
	Actual				
10.	Prediction				
	Actual				
11.	Prediction				
	Actual				
12.	Prediction				
	Actual				

Added Challenge

Which week was the best for weather, and why? Which week was the worst for weather, and why? Research and report on these topics: magnetic vs. true north; ocean currents; trade winds; barometric pressure; high and low pressure systems; icebergs; and hurricanes.

Marine Life Team Project Guide

Your team's challenge is to research and report on the vast array of marine life found in the regions *Great American III* will pass, and to record wildlife sightings during the voyage.

1. Research the variety of fish, marine mammals, birds, plankton, and other organisms that populate the ocean, and learn about food chains and migrations.
2. Find out about the industries based in the regions through which the *Great American III* will travel and the impact these industries have on marine life. Be sure to include fishing, oil exploration, whaling, shipping, etc.
3. Record wildlife sightings reported by Rich Wilson and illustrate a food chain that links many of the animals spotted during the voyage.

Date	Wildlife Spotted	What It Eats	What Feeds on It?

Teamwork Team Project Guide

Your challenge is to write a report on the teamwork involved in *Ocean Challenge Live!* You will need to gather clues from the biographies, essays, journals, and answered questions written by Rich Wilson on the sitesALIVE! website.

1. According to the biographies of Rich Wilson and the shore-based crew, what in their backgrounds has prepared them to work as a team?

2. Keep track of the teamwork challenges throughout the voyage by answering the following questions:

a. How does the crew decide how to share the work?

b. How do they make their decisions?

c. What do they do when one of them makes a mistake?

d. What else do you notice about their working as partners?

Added Challenge

Based on what you learned from Skipper Wilson and his shore-based crew, make a guidebook on the subject of working as a team.

Book & Movie Team Project Guide

Your challenge is to write a story of the voyage. This story will then be used to create both a book and a movie or play. You may be assigned to write your story about one week, a few weeks, or the whole voyage.

Writing the Book

1. Start with this important step: outline the story of the *Great American III*'s voyage.

2. Decide if you will use any special features. For example, you may decide to include maps and charts.

3. Research how reporters tell stories. Read at least three newspaper articles about events. Discuss the following questions, then make a list of "Tips for Good Writers" based on what you learn from the discussion.

- **a.** How does the writer keep the reader interested?
- **b.** How does the writer work facts into the story?
- **c.** How does the writer begin the story?
- **d.** How does the writer end the story?
- **e.** What else do you notice about the way the story is written?

2. Write a story of the voyage using your Tips for Good Writers as a guide. You can divide the writing into chapters, with each team member responsible for one chapter.

Book & Movie Team Project Guide

Planning the Movie

1. Music: What music (if any) will you include in this scene?

2. Actors: Who should play the characters in this scene? (You can cast male or female actors for the roles.)

3. Dialogue: What should each character in this scene say?

Scene # 1		
Situation (problem or event)		**Actions Taken**
Scene Characters	**Played by…**	**Music (if any)**
Actor/Character	**Dialogue**	

Added Challenge

Make a video report of the voyage using the music and dramatic scenes you have planned.

Nutrition & Health Team Project Guide
(Extra Week)

Your challenge is to learn about and report on the food, water, medical, and sleep needs of Rich while he is aboard *Great American III*.

1. Prepare for Your Job: Interview a coach, athlete, nurse, doctor, or nutritionist to find answers to the following questions:

a. How many daily calories does a person doing hard physical labor 12 hours per day need to consume?

b. What foods are high in energy?

c. How much water does an adult under a lot of physical strain need each day?

d. Rich Wilson has had severe asthma since childhood. What is asthma? What special medical needs or concerns does a person with asthma have?

e. What kinds of medical supplies should people take on a long, non-stop ocean voyage?

f. How many hours of sleep should Rich Wilson get during a 24-hour period? Since Rich will be alone on board, how long should he sleep in one stretch?

g. What other advice does the health expert have for Rich on such a trip?

2. Recommend Foods: Make a list of the kinds of foods that Rich should take along. Remember there is no refrigerator on the boat.

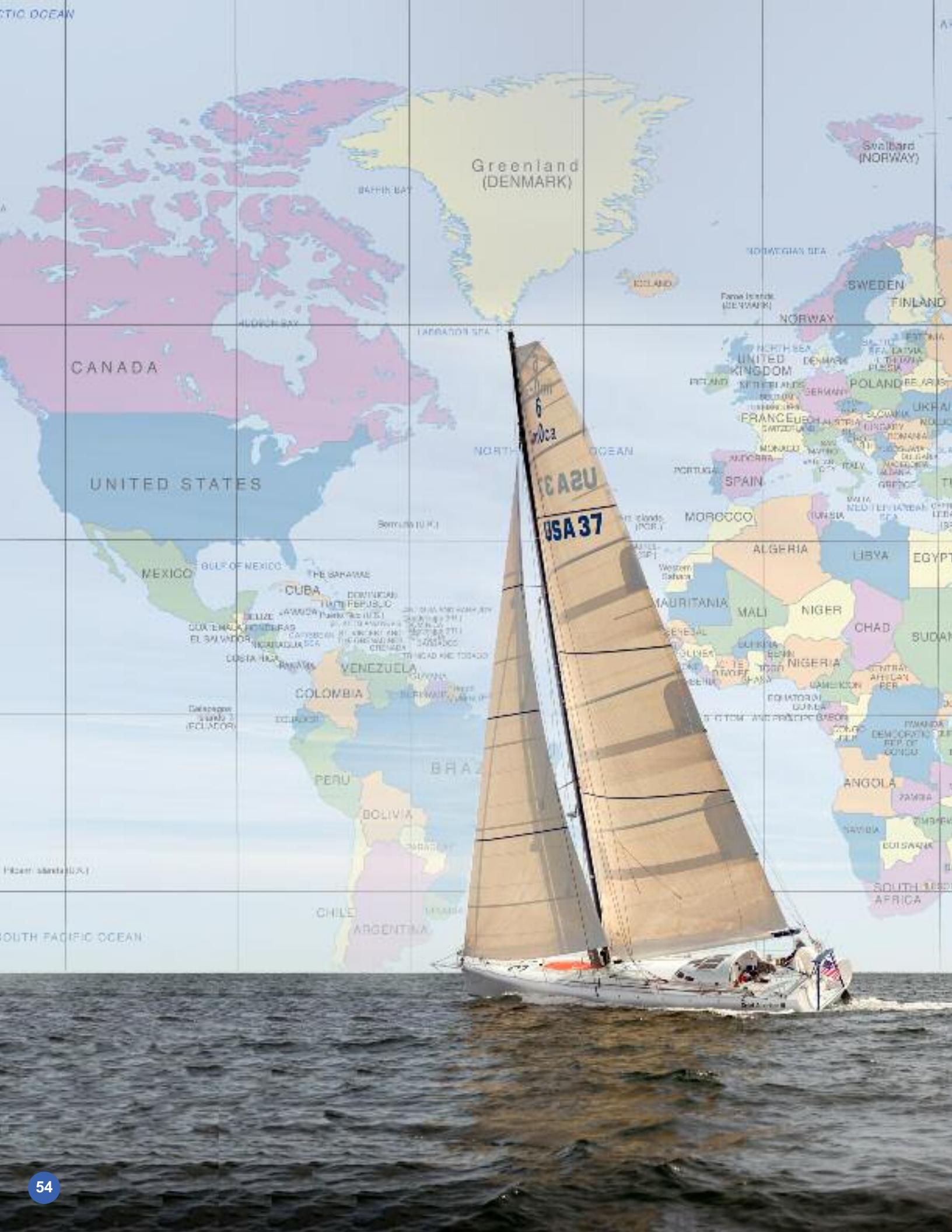
3. Food Consumption: Design a balanced and practical menu that will provide the necessary calories and nutrients for Rich during a 24-hour period.

4. Water Consumption: Rich gets fresh drinking water from the ocean salt water by using a machine called a desalinator. Figure out how much drinking water he will have to make each day.

5. Pack the Medicine Chest: Make a list of the supplies that Rich should be sure to pack to provide for their health and medical needs.

Added Challenge

Find out how Rich's nutritional and calorie needs will change as they travel through different climates. Make a calorie chart of foods you think Rich should eat.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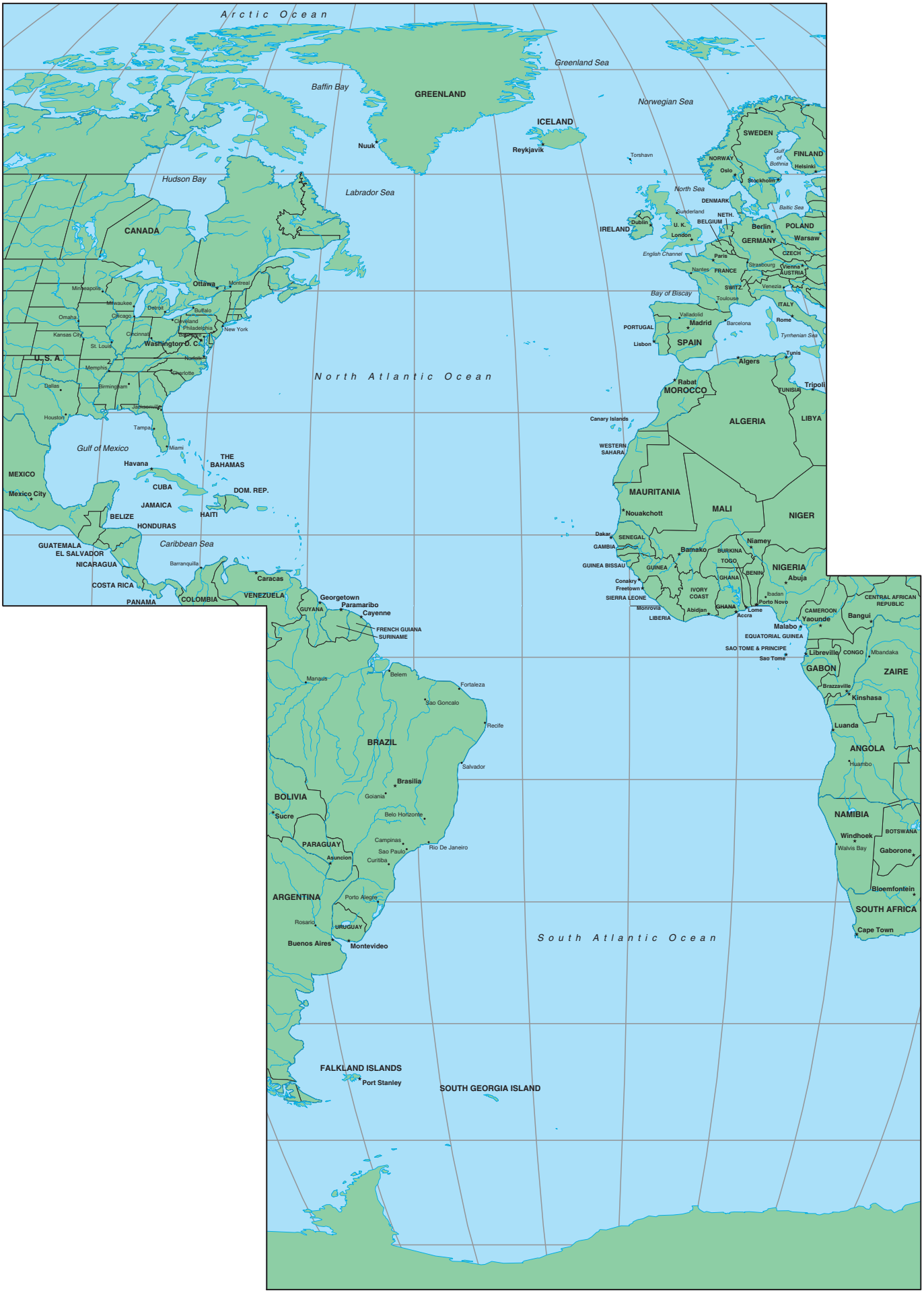
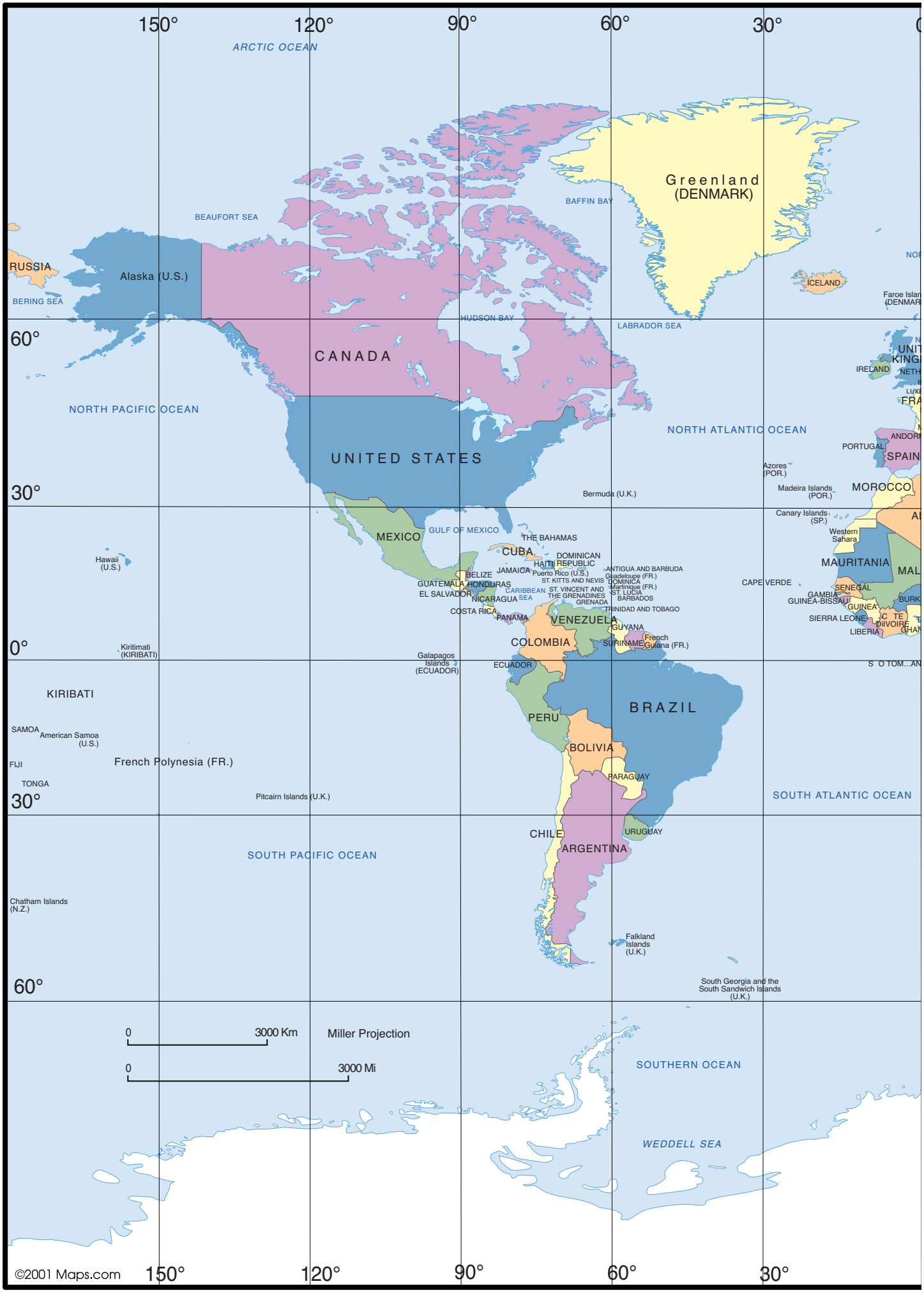
USA 37

Atlantic Plotting Map




150°
120°
90°
60°
30°
ARCTIC OCEAN
Greenland
(DENMARK)
BAFFIN BAY
BEAUFORT SEA
RUSSIA
Alaska (U.S.)
BERING SEA
ICELAND
HUDSON BAY
LABRADOR SEA
60°
CANADA
NORTH PACIFIC OCEAN
NORTH ATLANTIC OCEAN
UNITED STATES
30°
Bermuda (U.K.)
MEXICO
GULF OF MEXICO
THE BAHAMAS
CUBA
DOMINICAN REPUBLIC
HAITI
JAMAICA
Puerto Rico (U.S.)
BELIZE
GUATEMALA
HONDURAS
EL SALVADOR
NICARAGUA
CARIBBEAN SEA
ST. KITTS AND NEVIS
ANTIGUA AND BARBUDA
Guadeloupe (FR.)
DOMINICA
Martinique (FR.)
ST. LUCIA
BARBADOS
ST. VINCENT AND THE GRENADINES
GRENADA
TRINIDAD AND TOBAGO
COSTA RICA
PANAMA
VENEZUELA
GUYANA
SURINAME
French Guiana (FR.)
COLOMBIA
ECUADOR
Galapagos Islands (ECUADOR)
Hawaii (U.S.)
Kiritimati (KIRIBATI)
0°
KIRIBATI
SAMOA
American Samoa (U.S.)
FIJI
French Polynesia (FR.)
TONGA
Pitcairn Islands (U.K.)
BRAZIL
PERU
BOLIVIA
PARAGUAY
SOUTH ATLANTIC OCEAN
CHILE
URUGUAY
ARGENTINA
SOUTH PACIFIC OCEAN
Chatham Islands (N.Z.)
Falkland Islands (U.K.)
South Georgia and the South Sandwich Islands (U.K.)
0
3000 Km
Miller Projection
0
3000 Mi
SOUTHERN OCEAN
WEDDELL SEA
IRELAND
PORTUGAL
SPAIN
Azores (POR.)
Madeira Islands (POR.)
MOROCCO
Canary Islands (SP.)
Western Sahara
MAURITANIA
CAPE VERDE
SENEGAL
GAMBIA
GUINEA-BISSAU
GUINEA
SIERRA LEONE
LIBERIA
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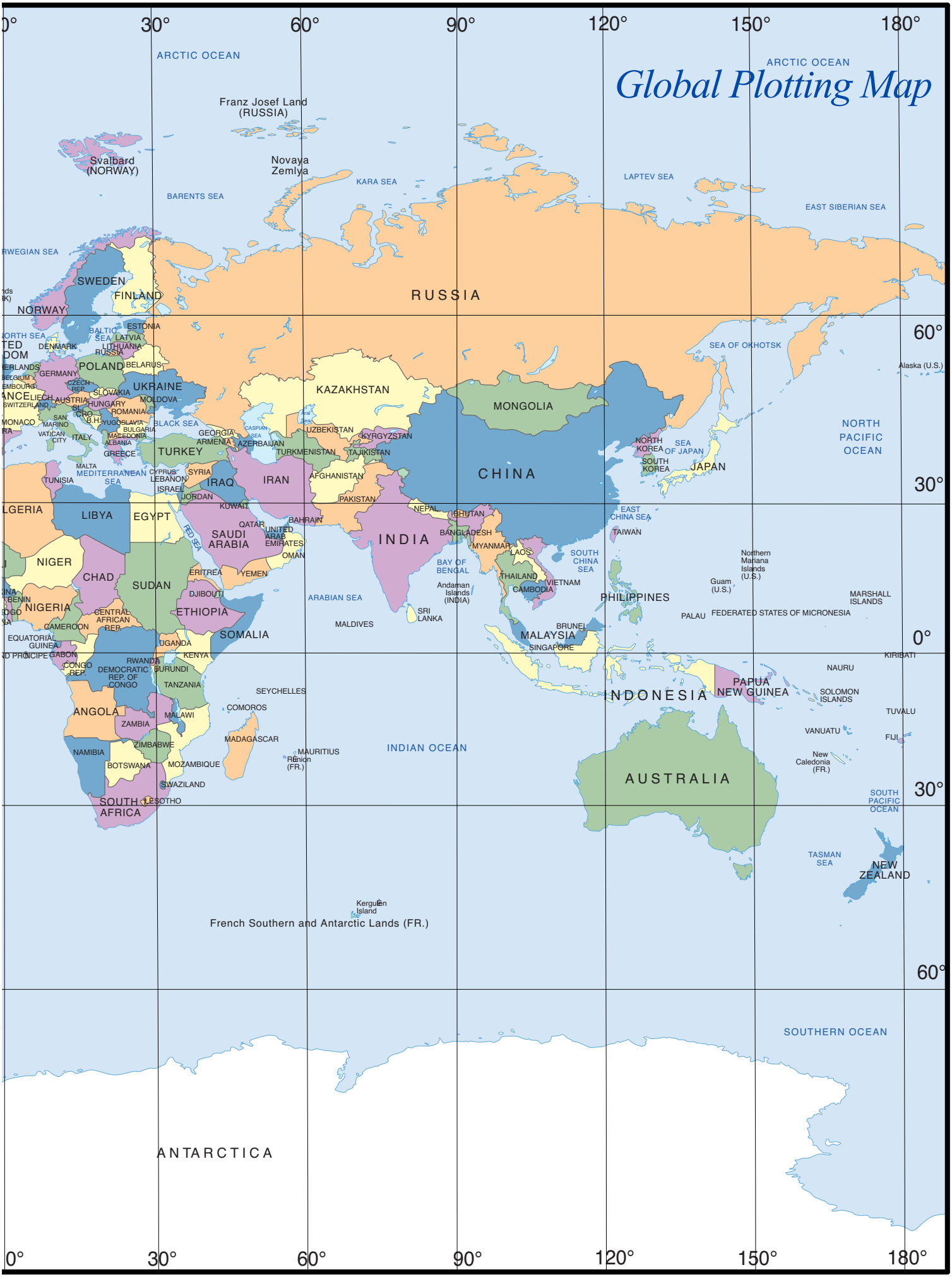
Global Plotting Map
ARCTIC OCEAN
Franz Josef Land (RUSSIA)
Svalbard (NORWAY)
Novaya Zemlya
BARENTS SEA
KARA SEA
LAPTEV SEA
EAST SIBERIAN SEA
SEA OF OKHOTSK
Alaska (U.S.)
RUSSIA
SWEDEN
FINLAND
NORWAY
ESTONIA
LATVIA
LITHUANIA
DENMARK
POLAND
BELARUS
GERMANY
UKRAINE
MOLDOVA
KAZAKHSTAN
MONGOLIA
CHINA
NORTH PACIFIC OCEAN
NORTH KOREA
SEA OF JAPAN
SOUTH KOREA
JAPAN
BLACK SEA
GEORGIA
ARMENIA
AZERBAIJAN
UZBEKISTAN
KYRGYZSTAN
TURKMENISTAN
TAJIKISTAN
TURKEY
SYRIA
IRAQ
IRAN
AFGHANISTAN
PAKISTAN
MEDITERRANEAN SEA
CYPRUS
LEBANON
ISRAEL
JORDAN
TUNISIA
LIBYA
EGYPT
KUWAIT
QATAR
BAHRAIN
UNITED ARAB EMIRATES
OMAN
SAUDI ARABIA
RED SEA
NEPAL
BHUTAN
INDIA
BANGLADESH
MYANMAR
LAOS
THAILAND
CAMBODIA
VIETNAM
EAST CHINA SEA
TAIWAN
SOUTH CHINA SEA
BAY OF BENGAL
Andaman Islands (INDIA)
ARABIAN SEA
SRI LANKA
MALDIVES
PHILIPPINES
Northern Mariana Islands (U.S.)
Guam (U.S.)
MARSHALL ISLANDS
PALAU
FEDERATED STATES OF MICRONESIA
BRUNEI
MALAYSIA
SINGAPORE
NIGER
CHAD
SUDAN
ERITREA
YEMEN
DJIBOUTI
ETHIOPIA
SOMALIA
NIGERIA
CENTRAL AFRICAN REP.
CAMEROON
EQUATORIAL GUINEA
GABON
CONGO REP.
DEMOCRATIC REP. OF CONGO
RWANDA
BURUNDI
UGANDA
KENYA
TANZANIA
SEYCHELLES
COMOROS
MADAGASCAR
MAURITIUS
Réunion (FR.)
INDIAN OCEAN
ANGOLA
ZAMBIA
MALAWI
ZIMBABWE
NAMIBIA
BOTSWANA
MOZAMBIQUE
SWAZILAND
LESOTHO
SOUTH AFRICA
INDONESIA
PAPUA NEW GUINEA
NAURU
KIRIBATI
SOLOMON ISLANDS
TUVALU
VANUATU
FIJI
New Caledonia (FR.)
AUSTRALIA
SOUTH PACIFIC OCEAN
TASMAN SEA
NEW ZEALAND
Kerguelen Island
French Southern and Antarctic Lands (FR.)
SOUTHERN OCEAN
ANTARCTICA
0°
30°
60°
90°
120°
150°
180°

Ship Schematics
Great America III

Nautical Glossary

aft ***(adj.)*** – towards the back or stern of a boat

aloft ***(adj.)*** – high above the deck of a ship in the rigging or on a mast

autopilot ***(n.)*** – an instrument designed to steer a boat and automatically maintain a predetermined course

barometer ***(n.)*** – an instrument for measuring atmospheric pressure and forecasting the weather

beam ***(n.)*** – the width of a ship at the widest part

bearing ***(n.)*** – a determination of position; one point's position with respect to another or to the compass

beat ***(v.)*** – to sail a boat to windward (into the wind) by tacking

berth ***(n.)*** – 1: a space for anchoring or tying up; 2: a job or position; 3: a built-in bed or bunk

bilge ***(n.)*** – the bottommost interior part of a ship; the inner, lower part of a ship's hull

block ***(n.)*** – a wooden, metal or plastic case containing pulleys, through which turns of line are threaded for the purpose of gaining mechanical advantage or changing the direction of motion

boom ***(n.)*** – a spar extending from a ship's mast to hold the bottom of a sail outstretched

bow ***(n.)*** – the front end of a boat

bulkhead ***(n.)*** – any of the upright partitions separating parts of a ship to protect against leakage

capsize ***(v.)*** – to overturn

car ***(n.)*** – a sliding fitting that attaches to a track, allowing for the adjustment of blocks or other devices attached to the car; also known as a slide

catamaran ***(n.)*** – a boat with two connected but distinct parallel hulls

chart ***(n.)*** – a map used in marine navigation

clew ***(n.)*** – the lower aft corner of a mainsail or jib, or either lower corner of a square sail

clipper ***(n.)*** – a sharp-bowed, narrow-beamed sailing ship built for great speed

cockpit ***(n.)*** – a sunken space in the deck of a boat, usually towards the stern and for use by the helmsman

"come about" ***(v.)*** – to change course so that the sail(s) shift from one side of the boat to the other; to tack

companionway ***(n.)*** – a hallway or ladder passage aboard a ship

compass ***(n.)*** – an instrument that shows direction, especially with the aid of a magnetic needle which swings freely and points to magnetic north

coordinate ***(n.)*** – any of a set of numbers in a reference system (e.g., on a map) that determine the location of a point (or ship)

course ***(n.)*** – the direction in which a ship is moving, based on the 360-degree compass; bearing

current ***(n.)*** – the horizontal motion of water, caused by tides, local winds and trade winds

daggerboard ***(n.)*** – a dagger-shaped board that projects down into the water below a sailboat's hull; its purpose is to help keep the boat on course

deck ***(n.)*** – a part of a ship that serves both as a floor and as a full or partial covering for lower ship levels

desalinator ***(n.)*** – a machine that removes salt from sea water to make fresh water

doldrums ***(n.)*** – a part of the ocean near the equator abounding in calms, squalls, and light shifting winds

ensign ***(n.)*** – a flag or banner displayed on a ship

equator ***(n.)*** – an imaginary circle around the earth, equidistant from the North and South Poles, which divides the earth into the Northern and Southern Hemispheres

fathom ***(n.)*** – a nautical measure of depth or distance equal to 6 feet

fore ***(adj.)*** – towards the front or bow of a boat

furl ***(v.)*** – to fold or roll up tightly and secure a sail

gale ***(n.)*** – a nautical term defining weather conditions in which wind speed ranges between 34 to 40 knots

galley ***(n.)*** – the kitchen of a ship

halyard ***(n.)*** – a rope used for raising and lowering a flag or sail

hatch ***(n.)*** – a covered opening in a ship's deck through which entrance can be made to a lower deck

Nautical Glossary (Continued)

head ***(n.)*** – the bathroom (or sink, shower and toilet) aboard a boat

heading ***(n.)*** – the direction in which a moving ship is pointed, usually expressed in compass degrees

headsail ***(n.)*** – any sail set forward of the foremast

headwind ***(n.)*** – a wind blowing towards the bow of the boat

"heave to" ***(v.)*** – to stop the forward movement of a ship by bringing the vessel's bow into the wind

heel ***(v.)*** – to lean or tilt to one side, as a ship or boat in a high wind

helm ***(n.)*** – the steering apparatus of a ship, such as a wheel or tiller

hull ***(n.)*** – the body of a boat

immersion suit ***(n.)*** – a special bodysuit designed to protect a person from the cold and wet in emergencies

"in irons" ***(adj.)*** – headed into the wind

INMARSAT ***(n.)*** – INternational MARitime SATellite; a satellite communication system used by ships at sea to communicate with other ships or with land-based locations

jib ***(n.)*** – a triangular sail secured to a stay forward of the mast

jibe ***(v.)*** – to pass the stern of a boat through the wind during a tack

keel ***(n.)*** – a ship's principal structural member, running lengthwise along the hull, to which the frames are attached

knot ***(n.)*** – rate of motion equal to 1 nautical mile or 6,076 feet per hour (about 1.15 miles per hour)

latitude ***(n.)*** – one of two coordinates (the other being longitude) used to locate a position at sea; marked in degrees north or south of the equator, from 0 degrees at the equator to 90 degrees north or south at the poles; one degree of latitude = 60 nautical miles; latitude is comparable to the x-axis on a graph

leech ***(n.)*** – the aft or trailing edge of a sail; the aft edge of a fore-and-aft sail

leeward ***(adj.)*** – in the direction towards which the wind is blowing

line ***(n.)*** – a rope used on a ship

log ***(n.)*** – a daily record of a ship's speed, progress, etc. and the events in its voyage; logbook

longitude ***(n.)*** – one of two coordinates (the other being latitude) used to locate a position at sea; marked in degrees east or west of the Prime Meridian (0 degrees longitude) located in Greenwich, England; longitude may range up to 180 degrees east or west; 180 degrees east and west, in fact, meet on the other side of the globe from Greenwich, at the International Date Line; longitude is comparable to the y-axis on a graph

mainsail ***(n.)*** – the largest sail on the ship

"make fast" ***(v.)*** – to firmly fasten or secure

mast ***(n.)*** – a tall vertical spar that rises from the keel or deck of a vessel to support the sails and rigging

monohull ***(n.)*** – a boat with one hull

nautical mile ***(n.)*** – a nautical unit of measurement equaling 1.15 statute (land) miles

port ***(n.)*** – the left side of a boat when facing forward

radar ***(n.)*** – a system or device which uses transmitted and reflected radio waves to detect objects, along with their direction, distance, height, and speed in relation to the device

reach ***(v.)*** – to sail with the point-of-sail between close-hauled and a run, with the wind coming from across the side of the boat

reef ***(n.)*** – the part of a sail which is rolled up to reduce the area exposed to the wind during a storm

reef ***(v.)*** – to shorten or reduce the size of a sail, usually done because of heavy winds

rigging ***(n.)*** – the ropes and chains used to support, position and control a vessel's masts, sails, yards, etc.

rudder ***(n.)*** – a broad, flat, movable piece of wood or metal, hinged vertically to the ship's stern; used for steering

run ***(v.)*** – to sail with the wind astern

set ***(v.)*** – to raise (e.g., a sail) into position

shackle ***(n.)*** – a U-shaped fitting closed with a pin across the open ends and used to secure sails to lines or fittings, lines to fittings, fittings to fittings, anchors to chain, etc.

sheet ***(n.)*** – a rope used to control a sail's angle to the wind

Nautical Glossary (Continued)

shroud ***(n.)*** – part of the standing rigging that helps to support the mast by running from the top of the mast to the side of the boat; sailboats usually have one or more shrouds on each side of the mast

spar ***(n.)*** – a stout rounded wood or metal piece (mast, boom, gaff, or yard) used to support rigging

spinnaker ***(n.)*** – a large, triangular headsail (at the front of a boat), used when reaching or running

spreader ***(n.)*** – a strut leading off a vessel's mast to hold the rigging wires out and keep the mast straight

squall ***(n.)*** – a brief, violent storm

starboard ***(n.)*** – the right side of a ship when facing forward

stay ***(n.)*** – a heavy rope or cable, usually made of wire, used as a brace or support for a ship's mast

staysail ***(n.)*** – a triangular fore-and-aft rigged sail fastened on a stay

stern ***(n.)*** – the back end of a boat

strike ***(v.)*** – to lower or take down (e.g., a sail)

tack ***(v.)*** – to bring the wind to the other side of a ship by bringing the bow through the wind

trade wind ***(n.)*** – a wind that blows steadily towards the equator from the northeast in the tropics north of the equator and from the southeast in the tropics south of the equator

trim ***(v.)*** – to adjust (e.g., sails)

trimaran ***(n.)*** – a boat with three connected but distinct parallel hulls

watch ***(n.)*** – any of the periods of duty into which the day is divided on a ship, so that the work is shared among alternating shifts of the crew

windward ***(adj.)*** – in the direction from which the wind is coming

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