

Around the Americas K–8 Teacher’s Guide

© Pacific Science Center

AROUND THE AMERICAS

Many of the fundamental properties of the ocean are changing: seawater pH is decreasing, endangering coral reefs; warming waters are causing sea level to rise, imperiling low-lying areas; and Arctic sea ice is shrinking, threatening local wildlife. Changes in the marine environment affect not only inhabitants of the sea, but also have great ramifications for both coastal communities and inland populations. These changes are heavily influenced by human activity. Consequently, individuals can play an important role in protecting and improving the health of our oceans.

To build awareness about ocean health on an international scale, Seattle’s Pacific Science Center and Boston’s Sailors for the Sea have launched the *Around the Americas* project in collaboration with the University of Washington’s Applied Physics Laboratory, the Joint Institute for the Study of the Atmosphere and Ocean, MIT Sea Grant College Program, and NASA’s Student Cloud Observations On-Line.

Around the Americas is a clockwise circumnavigation of the North and South American continents as though they were one gigantic island. In May 2009, a 64 foot sailboat named “*Ocean Watch*” departed Seattle and is scheduled to visit 31 ports in 12 countries over the course of its 13 month voyage. On board are four crew members and one Science Center educator. Ocean and atmospheric scientists are joining the crew for certain legs of the expedition to conduct research. The goal of the *Around the Americas* project is to use this unusual adventure to engage and educate citizens in North and South America about ocean health issues using science-driven education materials and activities.

ABOUT THE GUIDE

Welcome aboard! The *Around the Americas* K-8 Teacher’s Guide features seven inquiry-based lessons to engage your students in learning about different aspects of ocean health. Each lesson in this guide is aligned to the ocean literacy principles (www.oceanliteracy.net) and U.S. and Canadian national science standards. Each lesson is designed for students in grades 6-8 and includes suggestions for adapting the lesson to younger students. Lesson topics include ocean acidification, coral reef ecology, changes in sea level, and sustainable fisheries. Exercises on atmospheric aerosols, underwater sound, and sea ice directly relate to research projects on board: updates of these projects will be posted to the *Around the Americas* website (www.aroundtheamericas.org) throughout the voyage. Each lesson has “extensions” to explore each topic in greater depth.

Thank you for your interest in these materials and in the *Around the Americas* project: we encourage you to dive in and follow the progress of “*Ocean Watch*” and her crew on-line at www.aroundtheamericas.org.

TABLE OF CONTENTS

2	Around the Americas
2	About the Guide
5	Lesson 1: Coral, Carbon Dioxide and Calcification
10	Lesson 2: Inquiry into Ocean Acidification
15	Lesson 3: Ocean Currents and Marine Debris
21	Lesson 4: Aerosols and Clouds
28	Lesson 5: Snapping Shrimp
32	Lesson 6: Sustainable Fisheries
38	Lesson Extensions
44	Glossary
46	Recommended Teacher Resources
49	Bibliography

CREDITS

The *Around the Americas* K-8 Teacher's Guide was developed by Stephanie L. Anderson for Pacific Science Center under the direction of Dr. Kristin Ludwig. All materials were produced to complement the *Around the Americas* expedition. Layout design and illustrations by Clayton DeFrate.

We wish to thank colleagues at the University of Washington Applied Physics Laboratory and the Joint Institute for the Study of the Atmosphere and Ocean, Dr. Tansy Clay at the University of Washington School of Oceanography, and Dr. J. Burns at Bionavitas, Inc. for consulting with us during the development of this guide. We greatly appreciate the students and teachers at Oregon's Hosford Middle School, J. B. Thomas Middle School, and H.B. Lee Middle School and visitors to the Oregon Museum of Science and Industry for testing and improving these materials. We thank Facing the Future for permission to adapt one of their exercises for this curriculum.

Around the Americas is an ocean environment project organized by Pacific Science Center and Sailors for the Sea, in collaboration with the University of Washington Applied Physics Laboratory, the Joint Institute for the Study of the Atmosphere and Ocean, MIT Sea Grant College Program, and NASA. *Around the Americas* is made possible by generous lead grants from the Tiffany & Co. Foundation, Unilever, and the Rockefeller Family. Major support has been provided by James Bishop, Osberg Construction Co. and the Osberg Family Trust. The project is also supported by Charles Butt, Edmund B. Cabot, The Campbell Foundation, John Castle, Jim & Dee Claypool, The Ettinger Foundation, The Herbert W. Hoover Foundation, and Vantage in Philanthropy.

TIFFANY & CO.
FOUNDATION



