

An Expedition to the Seafloor - Teacher's Guide

Using Google Earth and Ocean Cores to Analyze Seafloor Spreading

Introduction

Tell your students they are going on an expedition to explore changes in the seafloor. They may be surprised to learn that the ocean floor is dynamic. Engage students in a discussion about the background information. You may choose to order the DVD "The New *JOIDES Resolution* in Film" to spur the discussion. The video presents five short films that introduce scientific ocean drilling, take you out on the *JOIDES Resolution* research drilling vessel, and explain the science done at sea. To request a DVD go to <http://www.oceanleadership.org/education/deep-earth-academy/resources/order-form>.

Throughout the discussion emphasize to students that they, just as the scientists in 1968, are collecting data and trying to determine their significance.

Learning Objectives

Students will be able to:

1. Use Google Earth to evaluate real data collected from the Deep Sea Drilling Project to discover evidence of seafloor spreading.
2. Use the data you collect to create a graph showing the relationship between distance from the spreading center and age of the sediments (Distance vs. Age).
3. Explain a historical perspective of science research.

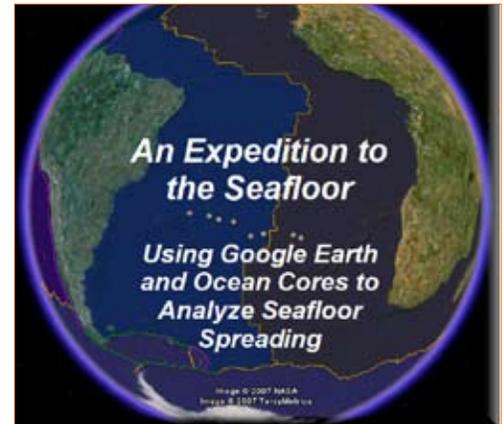
Target Age: Grades 5-12

Time: One to two class periods

National Science Education Standards

Standard A: Science as Inquiry – Abilities necessary to do science inquiry

Standard D: Earth and Space Science – Earth's history



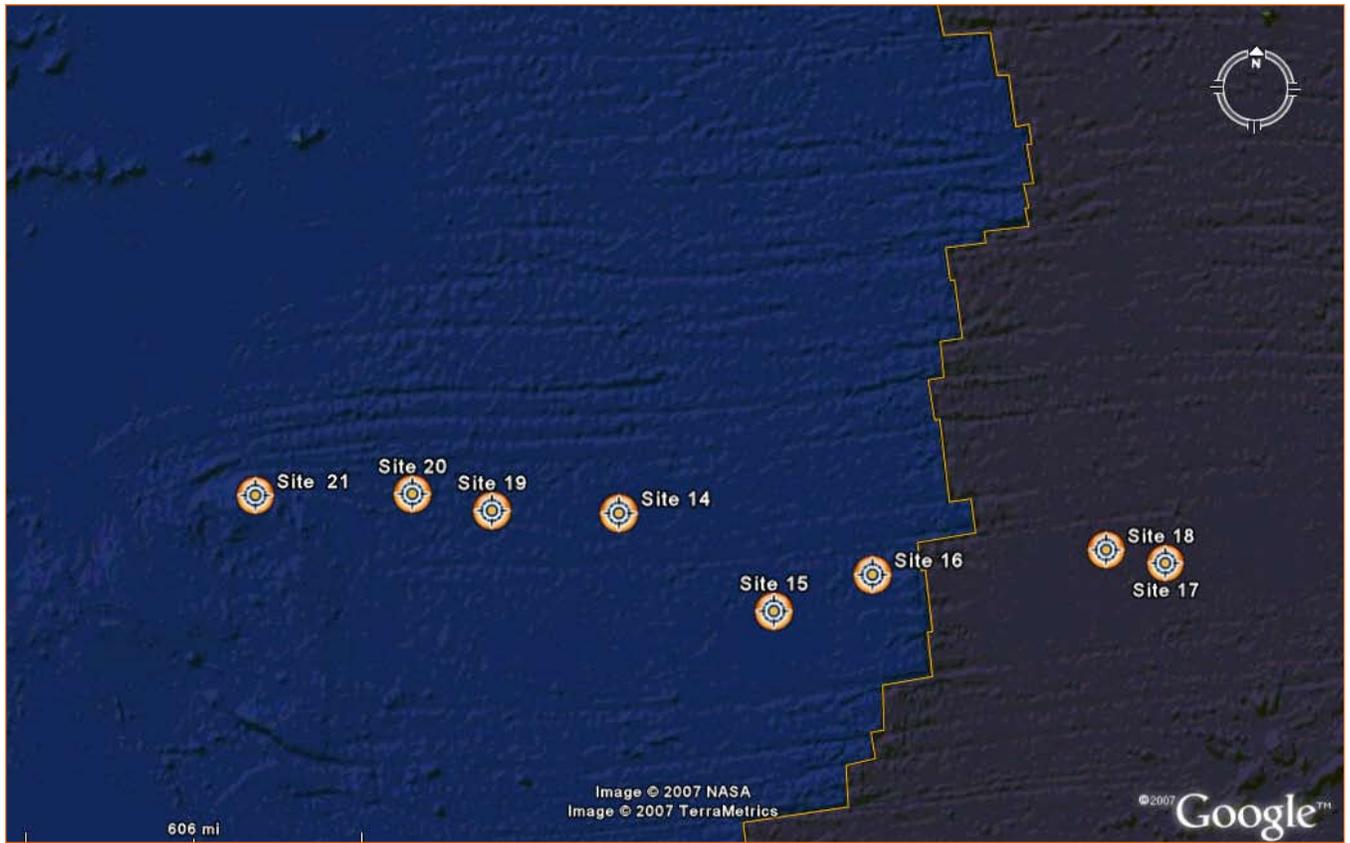
Ocean Literacy Essential Principles

1. Earth has one big ocean with many features
2. The ocean and life in the ocean shape the features of Earth
7. The ocean is largely unexplored.

Google Earth and Necessary Items

1. The activity may be downloaded from <http://www.oceanleadership.org/education/deep-earth-academy/educators/classroom-activities/an-expedition-to-the-seafloor-teachers-guide/>.
2. Download the latest version of Google Earth from <http://earth.google.com/>.
3. To implement this lesson you must also download the Google Overlay file (http://www.oceanleadership.org/files/seafloor_spreading.kmz). We recommend placing this file on the desktop of each computer for easy access during the lesson. To open the kmz file, open Google first and then select the File > Open menu.
4. The images are generally current to within the past three years. The Google Earth view of the ocean is digitally created so you can see the "look of the seafloor" without water. Of course, a real satellite picture of the ocean would show water.

Leg 3 Drill Sites



What To Do

You may choose to put students in groups of two so that one student is in charge of reading directions and writing answers while the other navigates the computer; this works especially well for mixed reading levels. In addition to the instructions, the student hand out helps students zero in on key concepts. We recommend printing class sets of the student guide in color to best show the screen shots. However, each student or student pair will need the answer pages, which may be printed in black and white.

Conclusion

Students should be able to locate the Mid-Atlantic Ridge and understand its significance. The students should conclude that the DSDP expedition provided strong evidence for the theory of seafloor spreading. As students compare ages and distances of core samples from the Mid-Atlantic Ridge they should conclude that the seafloor is spreading outward from the ridge. Students should also begin to think about what might be occurring in the Pacific Ocean if the Atlantic Ocean is spreading. This lesson should provide a strong foundation for a Plate Tectonics Unit.

