

Lesson Plan

Exploring National Marine Sanctuaries

FOCUS

Diverse marine ecosystems and protection of their natural and cultural resources

FOCUS QUESTIONS

- What kinds of living organisms live in national marine sanctuaries?
- What natural and cultural resources are protected by national marine sanctuaries?
- What are some of the similarities and differences among the national marine sanctuaries?
- What are some of the resource protection issues facing various national marine sanctuaries?

LEARNING OBJECTIVES

Students will use the Internet to research national marine sanctuaries, America's ocean and Great Lakes treasures.

Students will identify major groups of organisms living in and protected by national marine sanctuaries.

Students will describe various habitats found in national marine sanctuaries.

Students will list characteristics that define various national marine sanctuaries, including their similarities and differences.

Students will identify some of the resource issues threatening the oceans, and

specifically our national marine sanctuaries.

Students will describe human interactions with the ocean and will be able to explain the importance of marine protected areas.

Students will summarize and communicate their research findings in a written poster presentation and through a 5-minute oral presentation.

GRADE LEVEL

7-8 (Life Science/Earth Science)

MATERIALS

- "National Marine Sanctuaries" student project worksheet, available for download at the National Marine Sanctuary Education Program website. Go to <http://sanctuaries.noaa.gov/education/> and use the left hand navigation bar to go to "For Teachers," then "Curriculum," then "Explore Sanctuaries Lesson."
- "Further Understanding" student worksheet, available for download at the same website given above.
- Each student group will need poster board and materials to make posters
- Overhead of national marine sanctuaries map, available for download and printing at <http://www.sanctuaries.noaa.gov/omsmaplarge.html>



- ☐ Internet access

AUDIO VISUAL MATERIALS

- ☐ Overhead transparency of the national marine sanctuaries map.

TEACHING TIME

20 minutes for teacher to introduce project; two 45-minute class periods for students to orally present projects; plus time for students to conduct Internet research and collaborate on poster presentation (may be completed as an out-of-class assignment that will take approximately 2-5 hours)

SEATING ARRANGEMENT

Classroom style for presentations;
Groups of 2-3 students for research (if conducted in class)

MAXIMUM NUMBER OF STUDENTS

30

KEY WORDS

National Marine Sanctuary
Species
Marine Protected Area
Ecosystem
Habitat
Biodiversity
Conservation
Environmental Stewardship
Sustainability
Natural Resources
Cultural Resources

BACKGROUND INFORMATION

Science in the middle grades should provide students with opportunities to enrich their growing knowledge of

biodiversity. In this lesson, students will learn about the national marine sanctuaries found in the Pacific and Atlantic oceans and off the coast of American Samoa. They include breeding and feeding grounds of whales, sea lions, sharks, and sea turtles; significant coral reefs and kelp forest habitats; and the remains of the U.S.S. *Monitor*, a Civil War ironclad that sank off the coast of North Carolina. By learning about the biodiversity, ecological integrity, and cultural legacy of these marine sanctuaries, students can place into context what they are learning about the interdependence of living things on our planet.

After being introduced to the marine sanctuaries as a class, students will work in small groups to develop posters that highlight key ideas in the benchmarks in the context of the individual marine sanctuaries.

The article "National Marine Sanctuaries: Living Classrooms" in *Current: The Journal of Marine Education* (Volume 21, Number 1, 2005) provides an excellent introduction into the overall purpose and mission of the national marine sanctuaries. *Current* is published by the National Marine Educators Association and is available through libraries (ISSN 0889-5546). The relevant article may be copied for non-commercial use as stipulated by the copyright permission. Educators may request a hard-copy of this article by contacting the National Marine Sanctuary Program (see "For More Information").



PREPARATION

1. Download a map of the national marine sanctuaries, available for download and printing at <http://www.sanctuaries.noaa.gov/oms/omsmaplarge.html>. Make an overhead transparency of this map
2. Divide the class into fourteen different groups of 2 or 3 students. (Smaller classes will be unable to present all fourteen National Marine Sanctuary System sites, but are still able to achieve the objectives of this activity.) Assign each group one of the thirteen national marine sanctuaries or the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve.

LEARNING PROCEDURE

1. Project the map that depicts the locations of national marine sanctuaries. Ask students if they recognize any of the places highlighted on the map. If any of the students have been to any of the locations, ask them to describe what they are like. Tell students that the map shows federally protected waters called national marine sanctuaries. Ask them to speculate about what the term "marine sanctuaries" might mean. Then tell them that they will find out more about the characteristics of these environments and why they are in need of special protection.
2. Inform the class of small group assignments and pass out the "National Marine Sanctuaries" student project worksheet. Instruct them that they will conduct web-based research using the

National Marine Sanctuary Program website. (Note: This could provide a good opportunity for the teacher to explain the use of approved websites to conduct research.) Instruct the students that they will use the website and its related links to explore their sanctuary site. Note that at a minimum, students should read the introductory page for their site and its "Information Sheet," which can be accessed through the link on the bottom of the left hand navigation bar. The "Extensions" section of this lesson provide additional links that you may wish to have students explore; the "Encyclopedia of the Sanctuaries" found at <http://marinelife.noaa.gov/> depicts the top one-hundred species found in eight different sanctuary sites through vibrant photographs, videos, and up-to-date information on each species.

3. Instruct students that they will use the "National Marine Sanctuaries" student project worksheet to help guide them through discovery of America's ocean and Great Lakes treasures. Even though students will work in groups, make sure that each student completes the student sheet in his/her own words:
 - What kinds of living things seem to be found in all of the sanctuaries?
 - What are some of the similarities and differences among the sanctuaries?
 - What are some of the problems faced by the various ecosystems described?



4. Working in groups, and using the worksheet, students will gather information about each of the sanctuaries. Each group will create a poster of its assigned marine sanctuary and then present its information to the class in a 5-minute oral presentation. Inform the groups of their oral presentation due dates.
5. On oral presentation days, student groups will present their posters to the class. After all of the presentations have been made, display the posters around the classroom and provide students time to view the posters. Encourage students to take notes during the presentations of the posters and as they view the displayed posters. As they do this, they should individually complete the "Further Understanding" student worksheet, which asks them to compare and contrast their sanctuary with the other sanctuaries.

Students should be able to describe the different goals of the national marine sanctuaries as they relate to the individual needs of the ecosystems they comprise. For example, the Gulf of the Farallones is home to the largest concentration of breeding seabirds in the continental United States. As such, it seeks to preserve these resources by managing human activities that may damage habitat and species, by supporting restoration projects to revitalize disturbed areas, and by monitoring programs that provide information to assess changes from natural and human disturbance.

THE BRIDGE CONNECTION

www.vims.edu/bridge/--Click on "Ocean Science" in the navigation menu to the left, then navigate to (1) "Human activities," then "Policy"; (2) "Human activities," then "Enviro-concerns"; (3) "Biology," then "Biodiversity."

THE "ME" CONNECTION

Have students write an essay on how the ocean, or specifically a national marine sanctuary, directly benefits (or could benefit) their own lives.

CONNECTIONS TO OTHER SUBJECTS

English/Language Arts, Social Studies, Geography

EVALUATION

Individual project worksheets, group poster, and oral project presentation provide opportunities for assessment. Develop a grading rubric that includes performance on the individual research (Step 3), poster presentation (Step 4), oral presentation (Step 5), and individual analysis (Step 5).

EXTENSIONS

Visit <http://marinelife.noaa.gov> to learn about the top one-hundred species in eight different sanctuary sites.

Visit <http://oceanexplorer.noaa.gov/> to follow ocean explorations, many of them in sanctuary waters, in near real-time. Learn about ocean exploration technologies, observe remote marine flora and fauna in the multimedia gallery, review NOAA's 200-year history of ocean exploration, and discover additional NOAA resources in a virtual library.



RESOURCES

<http://sanctuaries.noaa.gov/> --Website of the National Marine Sanctuary Program

<http://sanctuaries.noaa.gov/education/> - National Marine Sanctuary Education Program website with sections specifically designed "For Students" and "For Teachers."

The Sustainable Seas Expeditions was a five-year project of underwater exploration and discovery of the marine world with special emphasis on the national marine sanctuaries. A glimpse into this expedition is found by accessing "Expeditions" at the following website: <http://www.nationalgeographic.com/seas/>

NATIONAL SCIENCE EDUCATION STANDARDS

Content Standard C: Life Science

- Regulation and Behavior
- Populations and Ecosystems
- Diversity and Adaptations of Organisms

Content Standard F: Science in Personal and Social Perspectives

- Populations, Resources, and Environments
- Natural and Human-induced Hazards
- Risks and Benefits

NATIONAL GEOGRAPHY STANDARDS

Essential Element 2: Places and Regions

- The physical and human characteristics of places
- That people create regions to interpret Earth's complexity

Essential Element 3: Physical Systems

- The characteristics and spatial distribution of ecosystems on Earth's surface

Essential Element 5: Environment and Society

- How human actions modify the physical environment
- How physical systems affect human systems
- The changes that occur in the meaning, use, distribution, and importance of resources.

FOR MORE INFORMATION

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CREDIT

When reproducing this lesson, please cite NOAA's National Marine Sanctuary Program and the National Geographic Society as the source, and provide the following URLs for further information: <http://sanctuaries.noaa.gov/education/> and <http://nationalgeographic.com/seas/>.

