



Exploring National Marine Sanctuaries

Each student team researches and reports on one of the National Marine Sanctuaries and completes a thought-provoking worksheet to compare and contrast their sanctuary with the others.

SUBJECTS

Science, English/Language Arts,
Social Studies, Geography

GRADE LEVEL

Grades 7 and 8

TIME

20 minutes to introduce project
two 45-minute class periods for
oral presentations
2-5 hours for students to conduct
Internet research and collaborate
on poster presentation

OBJECTIVES

Students will be able to

- use the Internet to research National Marine Sanctuaries.
- identify major groups of organisms living in and protected by National Marine Sanctuaries.
- describe various habitats found in National Marine Sanctuaries.
- list characteristics that define various National Marine Sanctuaries, including their similarities and differences.
- identify some of the resource issues threatening the oceans, and specifically National Marine Sanctuaries.
- describe human interactions with the ocean and be able to explain the importance of marine protected areas.
- summarize and communicate their research findings through a written poster presentation and a five-minute oral presentation.

BACKGROUND

In this lesson, students will learn about the National Marine Sanctuaries in the Pacific and Atlantic oceans, off the coast of American Samoa, and in the Great Lakes. The sanctuaries include the breeding and feeding grounds of whales, sea lions, sharks and sea turtles; significant coral reefs and kelp forest habitats; and the remains of the USS *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 gain a context for what they are learning about the interdependence of living things on our planet.

After a whole-class introduction to the marine sanctuaries, students will work in small groups to develop posters that highlight key ideas 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 to 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 noncommercial 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).

The *America's Underwater Treasures* episode of **Jean-Michel Cousteau: Ocean Adventures** also provides a useful introduction to each sanctuary.

TEACHER PREPARATION

Prepare a map transparency:

Download a map of the National Marine Sanctuaries (see Web Links).
Make an overhead transparency of this map.

MATERIALS

- National Marine Sanctuaries Student Project Worksheet
- Further Understanding Student Worksheet
- Poster board (one per student group) and materials to make posters
- Overhead of National Marine Sanctuaries map (see Web Links)
- Internet access
- Copy of *America's Underwater Treasures* episode of **Jean-Michel Cousteau: Ocean Adventures** (optional).
- *America's Underwater Treasures* Viewing Guide, found at pbs.org/oceanadventures/educators/treasures (optional).

WEB LINKS

National Marine Sanctuaries Map for Overhead

www.sanctuaries.noaa.gov/pgallery/atlasmaps/images/sanctuarymap_lg.jpg

National Marine Sanctuaries Information on Ocean Adventures

Web site

www.pbs.org/oceanadventures/episodes/treasures

Encyclopedia of the Sanctuaries

<http://marinelife.noaa.gov/>

STANDARDS

National Science Education Standards Grades 5-8

<http://www.nap.edu.cataog/4962.html>

Life Science -

Content Standard C:

Regulation and behavior
Populations and ecosystems
Diversity and adaptations of organisms

PROCEDURE

1. **Introduce National Marine Sanctuaries:** Project the transparency of the National Marine Sanctuaries map. Ask students if they recognize any of the locations highlighted on the map. If you have students who 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. **Assign topics:** Divide the class into 14 groups of two or three students. (Smaller classes will be unable to present all 14 National Marine Sanctuary System sites but will still be able to achieve the objectives of this activity.) Assign each group one of the 13 National Marine Sanctuaries or the Northwestern Hawaiian Islands Marine National Monument.
3. **Explain research options:** Inform the class of their small-group assignments and pass out the National Marine Sanctuaries Student Project worksheet. Tell students that they will conduct Web-based research using the National Marine Sanctuary Program Web site. (Note: This could provide a good opportunity for the teacher to explain the use of approved Web sites to conduct research.) The Extensions section of this lesson provides additional links that you may wish to have students explore; the Encyclopedia of the Sanctuaries depicts the top 100 species found in eight different sanctuary sites through vibrant photographs, videos and up-to-date information on each species.

In addition to the Web-based Information Sheet, have students view the segment of *America's Underwater Treasures* that applies to their assigned sanctuary and visit the Ocean Adventures Web site listed in the Web Links section for additional information on their assigned sanctuary. The segment locations are identified in the Viewer Guide.

4. **Review worksheet:** Instruct students to use the National Marine Sanctuaries Student Project worksheet to help guide them through the 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 or her own words.

Science in Personal and Social Perspectives -

Content Standard F:

Populations, resources and environments

Natural and human-induced hazards

Risks and benefits

Ocean Literacy:

Essential Principles and Fundamental Concepts

<http://coexploration.org/oceanliteracy/>

Essential Principle #1:

The Earth has one big ocean with many features.

h. Although the ocean is large, it is finite, and resources are limited.

Essential Principle #5:

The ocean supports a great diversity of life and ecosystems.

- a. Ocean life ranges in size from the smallest virus to the largest animal that has lived on Earth, the blue whale.
- d. Ocean biology provides many unique examples of life cycles, adaptations and important relationships among organisms (symbiosis, predator-prey dynamics and energy transfer) that do not occur on land.
- e. The ocean is three-dimensional, offering vast living space and diverse habitats from the surface through the water column to the seafloor. Most of the living space on Earth is in the ocean.
- f. Ocean habitats are defined by environmental factors. Due to interactions of abiotic factors such as salinity, temperature, oxygen, pH, light, nutrients, pressure, substrate and circulation, ocean life is not evenly distributed temporally or spatially; that is, it is "patchy." Some regions of the ocean support more diverse and abundant life than anywhere on Earth, while much of the ocean is considered a desert.

5. **Student research:** Have students work in groups and use the worksheet to 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 five-minute oral presentation. Inform the groups of their oral presentation due-dates.
6. **Oral presentations:** 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 them. Encourage students to take notes as they listen to the presentations and 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.
7. **Assessment:** 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 using monitoring programs that provide information for assessing changes from natural and human disturbance.

EXTENSIONS

- 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.
- Have students write an essay on how the ocean, or specifically a National Marine Sanctuary, directly benefits (or could benefit) their own lives.

**Essential Principle #6:
The ocean and humans are
inextricably interconnected.**

- c. The ocean is a source of inspiration, recreation, rejuvenation and discovery. It is also an important element in the heritage of many cultures.
- e. Humans affect the ocean in a variety of ways. Laws, regulations and resource management affect what is taken out of and put into the ocean. Human development and activity lead to pollution (point source, nonpoint source and noise pollution) and physical modifications (changes to beaches, shores and rivers). In addition, humans have removed most of the large vertebrates from the ocean.
- g. Everyone is responsible for caring for the ocean. The ocean sustains life on Earth, and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all.

FURTHER RESOURCES

Additional educator resources for *Jean-Michel Cousteau: Ocean Adventures* can be found at pbs.org/oceanadventures.

Also try:

- **The Bridge Connection**

www.vims.edu/bridge/

Click on "Ocean Science Topics" in the navigation menu to the left, then navigate to "Human activities," then "Environmental Issues," then "Policy" or "Ocean Science Topics," then "Biology," then "Biodiversity."

- **National Marine Sanctuary Program**

<http://sanctuaries.noaa.gov/>

- **National Marine Sanctuary Education Program**

<http://sanctuaries.noaa.gov/education/>

Web site with sections specifically designed "For Students" and "For Teachers"

- **Sustainable Seas Expeditions**

<http://www.nationalgeographic.com/seas/>

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 this Web site.

CREDIT

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For more information, contact

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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/>.

The lesson in this activity was based on an activity developed by the National Geographic Society and was adapted by Michiko Martin, National Education Coordinator for NOAA's National Marine Sanctuary Program.

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NAME _____

Your group will create a poster for one of the National Marine Sanctuaries being protected by the National Oceanic and Atmospheric Administration's (NOAA's) National Marine Sanctuary Program. For your sanctuary, you will find an introductory page, a link to an informational sheet, and a link to one or more Web sites that will provide more information about that sanctuary. Your poster should address all of the questions in the chart below.

You can also watch a segment about your sanctuary in the *America's Underwater Treasures* episode of **Jean-Michel Cousteau: Ocean Adventures**. Your teacher can direct you to the appropriate segment.

The resources you will need can be accessed from the following page:

National Marine Sanctuaries

<http://sanctuaries.noaa.gov>

INSERT PHOTO HERE

**As you explore, fill out the chart below to help you gather the information you will need.
Answer all questions.**

What is the name of the marine sanctuary?

Where is it located?

What kinds of habitats are found there?

What key species are found there?

How do these species interact with one another?

What are some of this sanctuary's unique features?

What role do humans play in this environment?

What are some of the major issues or problems faced in protecting this resource?

How are the natural and/or cultural resources being protected?

What kind of research is conducted at this sanctuary?

Based on the information you have gathered, explain why you think this area of the ocean was designated a National Marine Sanctuary and why it is afforded special protections.

NAME _____

Now that you have seen the posters prepared by your classmates and listened to their presentations, answer the following about marine sanctuaries:

Which National Marine Sanctuary is most like the one you presented? Which one is most different? Explain.

Name several characteristics that all of the National Marine Sanctuaries have in common.

Write a sentence describing the relationship of humans to ocean environments, particularly to the National Marine Sanctuaries.

How would you describe the overall mission of the National Marine Sanctuary Program?

What do you think might happen to some of these marine environments if they were not protected by NOAA's National Marine Sanctuary Program? Explain.
