OBJECTIVE: To give visiting students an introduction to the Monterey Bay National Marine Sanctuary and a brief history of the area they will be experiencing. Information given to students before the trip will give them an awareness and appreciation not only for the historical value of the area, but also for the preservation of the area and the value of the Monterey Bay, its marine inhabitants, and the importance of taking care of the living sea.

BACKGROUND INFORMATION
The teacher or leader of the visiting class can use this outline as a guide for an interactive discussion of the Santa Cruz Beach Boardwalk, Santa Cruz Wharf and the Monterey Bay National Marine Sanctuary. Understanding that some students may not have been exposed to much information regarding the ocean or the importance of historical preservation, this outline provides the teacher or leader with visual aids and discussion topics which are helpful in evoking ideas and responses. Boardwalk Bingo, a game designed to be a hands-on activity to reinforce the students’ knowledge of the material, is included.

Gray Whale
photo: Kip Evans MBNMS

Lesson Plan developed by O’Neill Sea Odyssey marine education program and the Santa Cruz Beach Boardwalk.
Examples of damage done to wildlife by careless disposal of plastic

Seagull

photos: Michigan Department of Natural Resources

Duck

Fish

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The Santa Cruz Wharf is fifth in a line of wharves that once stood between Cowell Beach and Riverside Avenue. The first was the Potato Wharf, followed by the Railroad Wharf, the Powder Mill Wharf, the Pleasure Pier, and finally the Santa Cruz Municipal Wharf that still stands today.

Before the wharves were built, lumber had to be floated through the surf to ships, and goods were ferried out on rowboats. This method of transportation didn’t always keep things dry, and splashed sacks of potatoes and produce would start to rot on the way to market.

The wharves were used to load and unload lumber, produce, gunpowder and, of course, fish. A pipe on the Pleasure Pier carried salt water to an indoor swimming pool at the Santa Cruz Beach Boardwalk.

Our present day wharf was constructed in 1914 to replace the Railroad Wharf, which had fallen into disrepair. At that time, the Railroad Wharf was used mainly to load redwood and fish onto the Santa Cruz-Felton narrow gauge train. After 57 years of use, the Railroad Wharf was badly in need of repairs. When the owners of the aging wharf were asked to make repairs, they refused, and the Santa Cruz Council feared a loss of shipping trade.

The only alternative for the city was to finance a new wharf that could meet the commercial needs of the day. Citizens approved a bond issue in the amount of $172,000 to build one of California’s finest wharves. The Santa Cruz Municipal Wharf took over the job of the Railroad Wharf in 1914 and was the main route of transportation for hundreds of thousands of tons of fish.

The Wharf provided only a railroad track, a warehouse and a few other necessities for ocean trade. Over time, the railroad ceased operation and was demolished, allowing the Santa Cruz Wharf to evolve into the attraction of shops and restaurants that we know today.
Early on the morning of June 22, 1906, flames roared through the roof and walls of the Neptune Casino at the Santa Cruz Beach Boardwalk. Firemen were helpless because, in spite of having the whole Pacific ocean a few steps away, there was no way to pump water to fight the fire. They watched, horrified, while the Casino burned right down to its foundation. This was only one of the disasters the Boardwalk would experience and overcome during its long history.

The second Casino, which still stands at the beginning of the twenty-first century, was opened to the public exactly one year after the great fire, on June 22, 1907. Next to the Casino (now called the Cocoanut Grove) was an indoor, warm salt-water natatorium, or swimming pool, called the Plunge. Continuing along the Boardwalk toward the San Lorenzo River, one would see a skating rink, aquarium, photograph gallery, and the Pleasure Pier—all of which had escaped the 1906 fire.

One of the first rides was the L. A. Thompson Scenic Railway. Open cars traveled over a track of small hills running along the outer edge of the Boardwalk. The Scenic Railway was tame by today's standards, but riders of the time were thrilled.

Two of the earliest rides are still at the Boardwalk. The first is the classic Looff carousel, which was delivered to the Boardwalk by woodcarver Charles I.D. Looff in 1911. After nearly a century, children who ride the graceful, beautifully painted horses today may be riding the same steed their parents, or grandparents, or great-grandparents rode many years ago.

The second is the Giant Dipper roller coaster, built by Looff’s son, Arthur, in 1924. Arthur Looff imagined his giant wooden coaster would be, in his words, a “combination earthquake, balloon ascent and aeroplane drop.” With a heart-stopping 70-foot drop on the first hill, and speeds up to 55 mph, the Giant Dipper was an immediate success.

The carousel and the Giant Dipper are both National Historic Landmarks, an honor awarded only to historic places that have contributed substantially to the engineering, architectural, and cultural history of the nation.

The Boardwalk’s history includes more than rides and games. Crowds came in 1924 for the first Miss California Pageant, and the winner, Faye Lanphier, went on to become Miss America.

Floods have threatened the Boardwalk several times over the years. In 1952, icy, storm-driven waves actually thundered over the Cocoanut Grove colonnade and into the warm salt water of the Plunge.

The 1989 Loma Prieta earthquake made the Boardwalk tremble and shake, but only the miniature golf course was seriously damaged. Rebuilt and named Neptune’s Kingdom, this amusement center has an 18-hole miniature golf course, a video arcade, a game deck with pool tables and air hockey, and a wall of historic photographs called the Historium.

Early in the twentieth century, fun seekers at the park tried to win prizes at a Milk Bottle Toss, and a Hi-striker, and walked through a huge clown’s mouth into the traditional, old-fashioned Fun House. Present day visitors can try their skill at Milk Bottle and Hi-striker games, which are still in play. But new rides like the Double Shot tower which blasts riders 125 feet skyward at more than 3 G’s, and the swinging Fireball, which may leave your stomach in the clouds, offer the latest in amusement park thrills.
Marine Sanctuary (MBNMS) was established in 1992. It encompasses over 500 square miles. 
◆ The idea for the MBNMS was brought about by a concern regarding oil drilling in the Monterey Bay. The MBNMS prohibits oil drilling from Marin County to San Simeon.
◆ Part of the Monterey Canyon is included in the MBNMS. The portion of the Canyon within the Sanctuary is over 10,000 feet deep. The Canyon is over 15,000 feet deep at its deepest point, which makes it larger and deeper than the Grand Canyon.
◆ The MBNMS provides regulations protecting wildlife and wildlife habitats. Fishing, boating, beach activities, sea floor exploration, airspace regulation, and sea freight are all regulated by the rules of the MBNMS.
◆ The greatest threat to the MBNMS is non-point source pollution. Non-point source pollution is pollution caused by individual citizens rather than factories, power plants, large corporations, etc. For example, pollution from cars, litter from storm drains, soap or cleaning agents used in driveways that empty into storm drains and improper disposal of motor oil or old paint are all non-point source pollution.
◆ Pollution and human activities can disrupt the balance of nature in the food chain. The food chain is how plants and animals depend upon each other for food and survival. For example, plant plankton are eaten by animal plankton which are eaten by anchovies which are eaten by salmon which are eaten by sea lions which are eaten by great white sharks. The ocean is filled with life forms and they are all dependent upon the health of the other animals and plants in the food chain. All life in the ocean (and out of it for that matter) is interconnected.
◆ Habitats in the MBNMS include the kelp forest, the rocky shore, the sandy sea floor, and the deep Monterey Canyon.
◆ The MBNMS provides a habitat for 26 types of marine mammals and over 350 different varieties of fish. The sanctuary is also a habitat for many protected species including the California sea otter, the brown pelican, the great white shark, the gray whale, the California sea lion and the leatherback, loggerhead, Pacific green, and Pacific ridley varieties of sea turtle.
◆ Kelp forests are a very important habitat in the MBNMS. Just like forests on land, the kelp forests provide shelter, camouflage, and food for many life forms. Most types of kelp are not like land plants, but are actually giant forms of algae.
◆ California sea otters live in kelp forests and rarely, if ever, come onto the shore. They live on shellfish such as sea urchins, crabs and abalone. Sea otters carry rocks as tools, which they use to break open shellfish. Sea otters depend on the kelp forest for shelter, food, and camouflage. Sea otters wrap themselves in the kelp to avoid drifting away from their food source while they sleep. Sea otters have very thick fur with up to 1,000,000 hairs per square inch on their bodies. This thick fur is the only protection that they have from the cold water. Oil pollution in the sea is especially dangerous to sea otters, because the oil removes the special layer of air in their fur that keeps them warm. When sea otters are exposed to oil pollution they often die quickly from exposure to extreme cold. Sea otters are at risk from oil pollution, boating, human competition for their food, disease from shellfish toxicity resulting from pollution, and exposure to plastic waste.
◆ Sea turtles and other animals often mistake plastic garbage such as plastic bags and six pack rings for jellyfish and squid and die from ingesting the plastic.
◆ Watersheds and storm drains carry oil, toxic waste and trash to the sea. Most of the pollution in the Monterey Bay comes from this source.
◆ Kelp is used as a thickening ingredient in many types of prepared foods and products. It can be found under the name carrageenan on ingredient labels of fruit roll ups, ice cream, salad dressing, whipped cream, chocolate milk, Jell-O pudding mix, brownie and cake mix, and many cosmetic products.

**DISCUSSION QUESTIONS**

1. What does the word sanctuary mean?
2. What is a marine sanctuary?
3. Why do you think we need a marine sanctuary here?
4. What is a food chain? Can you think of an example? On land? In the ocean?
5. What kinds of things do you think might be harmful to the bay? What kinds of human behavior?
6. What happens when wildlife comes into contact with different types of waste?
7. What does it mean when someone says an animal is endangered?
8. Where do sea otters live? What do they eat?
9. What are some threats to sea otters?
10. What kinds of animals live in forests on land? What kinds live in kelp forests?
11. How do people use kelp?
12. How can we be more responsible when we are fishing, boating, enjoying the beach?
13. What is a storm drain and how does a storm drain affect the bay?
14. Where does trash come from and where does it go when we throw it away?
15. How can we implement the three R’s (Reduce, Reuse, Recycle) at home and at school? What are some ideas for reducing, reusing, and recycling that can be implemented in all areas of our lives? Use examples of the many beneficial products made from recycled materials such as fleece fabric, insulation, kayaks, benches, and picnic tables made from recycled plastics.

www.beachboardwalk.com • www.oneillseaoyssey.org
Monterey Canyon in the Monterey Bay National Marine Sanctuary.

Notes:
Examples of products with kelp (carrageenan) as an ingredient.
**Boardwalk Bingo** is designed to bring together some of the points discussed in the classroom. To play, you must first decide if your students will play individually or split into small groups. Photocopy the appropriate number of game boards. Students should also be provided something to write with. (Something to write on, like a clipboard, may be helpful too.)

Start your groups on the end of the beach near the wharf and volleyball courts. Some of the Bingo answers are to be found on the wharf. The area encompassed by the game is from the wharf to the carousel on the Boardwalk. Give your students a time limit of about 30-45 minutes.

You will need to decide what constitutes a win. Here are some suggestions:
- Five in a row (across, down or diagonal)
- Four corners
- Black out the entire board
- An X made by two intersecting diagonals

Some boxes require written answers, which may be recorded on the back of the Bingo board or directly in the square.

It is up to you if you would like to award a prize at the end of the Bingo Game. (To be provided by the teacher).

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**Beach Bingo Follow-up Discussion Guide** (optional)

1. Discuss the Municipal Wharf and the Monterey Bay National Marine Sanctuary and its dimensions while encouraging the students to observe and identify wildlife.
2. Ask the class to think of and identify various threats to the health of the ecology of the bay; look for garbage pollution, oil, toxic waste, plastics, air pollution, poaching, over-fishing, etc.
3. Use visual aids to help the class understand what happens when waste is not properly disposed of. For example, find a six-pack ring or a plastic bag on the beach and discuss how sea turtles, seagulls and other animals can mistake plastics for food.
4. Find a fresh kelp sample on the beach. Encourage the students to touch, taste and smell. Look for small creatures living on your kelp sample. Discuss the relationship between sea otters and the kelp forest. Compare the kelp forests in the Monterey Bay to the redwood forests in the coastal mountain ranges. Have the students identify similarities and differences.
5. Have the students look down at the beach. Point out any visible waste. Observe how many trash receptacles are visible.
6. Throughout the program, always convey the message that solutions are within our reach. Communicate the benefits of communities working together and the power that a class of 30 students has when they work together to heal their environment.
1. Name one activity that Neptune’s Kingdom offers.
   Miniature golf, video games, pool tables, air hockey, historic photo display.
2. Spot a shell.
3. Name the northernmost county of the Monterey Bay National Marine Sanctuary.
   Marin County.
4. Name two things shipped from any of the Santa Cruz wharves.
   Fish, gunpowder, lumber, potatoes, produce, redwood.
5. Spot a crashing wave.
6. How many volleyball courts are on the main beach?
   These will have to be counted. The number varies by day and season.
7. Spot a sea gull.
8. Name a National Historic Landmark on the Boardwalk.
   The Giant Dipper roller coaster or the Looff carousel.
9. Spot some kelp.
10. Spot a fishing boat.
11. Spot a sailboat.
12. Pick up a piece of plastic.
13. Share a new fact that you’ve learned about the Monterey Bay.
14. How many lifeguard stations are on the main beach?
   These will have to be counted. The number varies depending on the season.
15. What is the total number of square miles in the Monterey Bay National Marine Sanctuary?
   Over 5000 square miles.
16. Name a type of whale that migrates by the Monterey Bay.
   The gray whale.
17. How many trash cans are on the main beach?
   Depending on season and attendance, there can be up to 80 trash cans on the beach.
18. Find the Giant Dipper.
19. Spot a pelican.
20. Spot a cigarette butt.
21. How long has the Santa Cruz Wharf been an institution in Santa Cruz?
   The wharf was built in 1914 to replace the Railroad Wharf.
22. How many cars are there on the Sky Glider?
   There are 42 cars, except during winter maintenance.
23. Spot a piece of driftwood.
24. What is the southernmost city of the Monterey Bay National Marine Sanctuary?
   San Simeon.
25. Who was the carousel named after?
   Charles I.D. Looff.
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