Crystal Cove State Park
8471 North Coast Highway
Laguna Beach, CA 92651
949.497.7647 wbonnin@parks.ca.gov

Greetings Educators:

Nowhere do we see the love for the outdoors more clearly than in the eyes of children. Therefore we look forward to working with you to help encourage your students' appreciation for nature.

We are enclosing a field trip guide to help you prepare your group for our interpretive program and to help your students receive the most rewarding educational experience. This manual includes some classroom teaching aids that will help you prepare your group before the day of the field trip. These preparatory aids are intended to enrich the students' learning experience and to establish an awareness of nature and the natural sciences. Please make sure this manual is made available to the other educators, teachers and leaders, within your institution, who will be participating in this and future Crystal Cove State Park interpretive programs.

"Parks as Classrooms" consists of eight different in-class presentations and two hikes. Our programs are curriculum-based drawing from the areas of Science, Ecology, History, and Social Studies. We can also customize programs to complement the unit of study being presented in the classroom.

Please provide the group with nametags. It is very helpful for the naturalist to be able to relate to the students and to address them by name.

Upon your arrival at the Park, your group will be met by a Park interpretive guide. The guide will welcome the group and briefly explain some basic manners for the Park but, teachers, leaders, chaperones and aids will be responsible for the class decorum, organization and discipline. The interpretive guide will conduct the educational program. It is recommended that one chaperone be assigned to every group of ten students.

The interpretive program fee is $2.50 for students. We accept cash or checks made payable to "State of California." Please submit payment on the day of the field trip, unless prior arrangements have been made.

We must receive a copy of the enclosed Group Reservation Request form signed by the institution's principle and the group's teacher before we can issue you a dated parking pass and program confirmation.

Thank you for choosing Crystal Cove State Park for your group field trip.

Sincerely,
Winter Bonnin, Naturalist
State Park Interpreter II

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Practicing Park Friendly Behavior

We welcome you and your group to one of the most interesting and beautiful nature parks in California. We are here to help you teach your students about these sensitive ecosystems and how to protect and preserve this valuable natural resource. Biologists and naturalists often report that we are "loving our native environment and wilderness to death".

We have established a few suggestions and rules that will help you to safely enjoy your fieldtrip and help to reduce the impact of groups exploring these sensitive ecosystems. We appreciate your cooperation in carefully reviewing these rules with your entire group before the day of the scheduled program.

1. Do not collect or remove anything, including shells, rocks, plants or animals, from Crystal Cove State Park.

2. Never pick up animals, chase animals or pry them from the rocks. If they are disturbed, they may harm you, and it will make a difference in their struggle for survival in this harsh environment.

3. Avoid moving or disturbing rocks and plants. There is usually some animal relying on each rock or plant for food, shelter and protection.

4. Walk slowly and carefully. Do not run or jump in the tidepools or in the woodlands. For your own safety and to avoid injuring plants and animals, stay on designated trails.

5. To avoid injury, always wear shoes with a firm sole, even if they get wet.

6. Avoid turning your back to the ocean waves and keep a watchful eye for the occasional extra large wave.

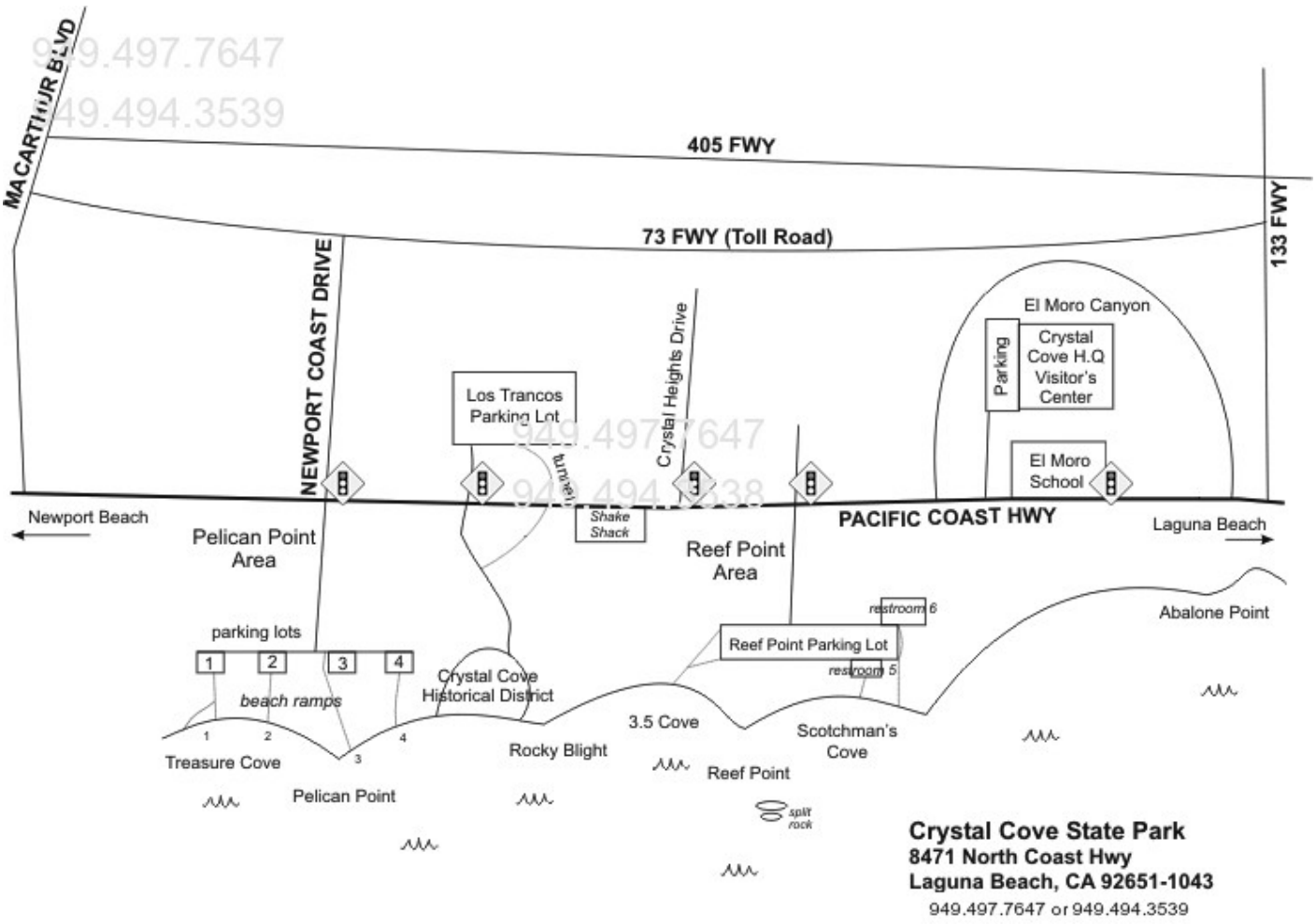
7. Carry extra drinking water when on hiking fieldtrips.

8. Please do not feed the wild animals because they will become dependent on human foods and human contact. They will lose their natural ability to forage in the wild and may develop hazardous behavior towards humans and other animals.

9. After enjoying your picnic in the Park, make sure all food and waste items are removed. Human food products are detrimental to the health and habits of wild animals and birds.

10. **After arriving in the correct, pre-assigned meeting area for your scheduled fieldtrip, wait for the naturalist. Do not proceed on the fieldtrip without the naturalist (unless you are enjoying a self-guided visit).**

Park Map



Directions to Los Trancos office:

Heading South on the 405

- Take the 73 south and exit MacArthur
- MacArthur to Pacific Coast Highway and turn left (south)
- Drive approximately 4 miles through Corona Del Mar to the stoplight Los Trancos
- Turn left and drive to the trailer at the back of the lot

Heading North on the 5

- Take the 133 Laguna Beach about 8 miles to Pacific Coast Highway (PCH)
- Turn right at PCH and drive approximately 3 miles to the stoplight Los Trancos
- Turn right and drive to the trailer at the back of the lot

Heading South on the 5

- Take the 55 south to the 73 exit MacArthur
- MacArthur to Pacific Coast Highway and turn left (south)
- Drive approximately 4 miles through Corona Del Mar to the stoplight Los Trancos
- Turn left and drive to the trailer at the back of the lot

Things to Bring

Teachers:

1. Group Reservation Request Form (Location & Parking Permit)
2. Park Map
3. First Aid Kit
4. Drinking Water
5. Animal Proof Lunch Container
6. Trash Bag
7. Name Tags
8. Program Fee

Students:

1. Appropriate Foot Ware (no flip-flops)
2. Layered Clothing (sweat shirt)
3. Hat
4. Sunscreen
5. Drinking Water
6. Lunch

Learning to Explore

1. **Can you hear a bird chirp or a lizard crawling through the leaves?** Walk and talk quietly as you explore.

2. **What can you see?** Walk with a purpose, searching for clues of animals, insects and plants. Walk carefully and observe each step you take. Running is not exploring.

3. **Can you smell the sea air, the sagebrush, the creek bed, the sea weed?** Explore with all of your senses to indicate where you are. Are you high, low, dry, damp, warm, cool?

4. **Stay on the trails.** Trails are made to show you the best places to explore. Trails help protect you from injury. Trails protect the wildlife from injury and damage by human visitors.

5. **Animals need to feel safe and protected.** You are a stranger visiting their home. Be gentle and kind. Explore thoughtfully.

6. **We should never collect or remove anything, including shells, rocks, plants or animals from the State Park.** If every one of us removed something, there would not be much left to explore. Wildlife needs all of these things together, in order to survive.

7. **Sharing your food with wild animals and birds is harmful.** Human food products are harmful to the digestion of wildlife. It teaches them to be dependent, to forget how to hunt and forage.

8. **Explore with a note pad**. During, and very soon after your field trip, make journal notes about all of the wildlife you saw or heard or smelled or felt. Share your experiences and journal notes with the other thoughtful explorers in your group.

9. **Enjoy nature and all of her gifts.** As John Muir said, "When we try to pick out anything itself, we find it attached to everything else in the Universe".

Happy Explorations and Adventures

Parks Online Resources for Teachers and Students (PORTS)

Distance Learning with California State Parks

California State Parks and schools have worked closely for decades to protect our state's resources and educate our children. Thousands of students visit state parks each year, but a growing percentage of the state's, student's are not afforded this opportunity due to geographic, economic or social barriers. The Parks Online Resources for Teachers and Students (PORTS) program bridges this divide by integrating innovative technology, interpretive programs, and educational materials to bring the importance of California State Parks into classrooms.

PORTS gives California State Parks the means to emphasize resource protection to students. To achieve its purpose PORTS fosters cooperative partnerships between California State Parks, the California K-12 High Speed Network (HSN), California public schools and other public and private entities.

Using the high bandwidth of the HSN and multiple technological approaches, PORTS delivers units of study to classrooms statewide. Each unit of study is developed collaboratively by a team of teachers and park specialists, and are aligned with the state's Academic Content Standards. Designed to augment what is already taught in the classroom, the units of study are comprised of two integrated elements:

- The "On-Line, On-Demand" element provides lesson plans, digital video, digital images, and other multimedia materials to teachers and students on the PORTS website (www.ports.parks.ca.gov). These materials prepare the students for the second element.
- "Videoconferencing" between the classroom and parks provide real-time, two-way, audio and video communication. Videoconferencing allows rangers to look directly at students sitting miles away in a classroom and engage them in conversation.

Among the units of study available are tide pool ecology from Crystal Cove State Park, a study of elephant seals at Año Nuevo State Reserve, a government unit which includes a tour of the State Capitol or the possibility to videoconference with a legislator, a gold rush unit at Columbia State Historic Park and a paleontology unit from Anza-Borrego Desert State Park.

PORTS enhances educational efforts and brings the relevancy of California State Parks to students who might not understand the important role they play in protecting our natural and cultural resources. Each live PORTS program incorporates a stewardship message, encouraging students to do their part in helping to preserve California's resources. After experiencing the parks virtually, many students are inspired to visit a park and personally experience a resource with which they were previously unacquainted.

Academic Content Standards

Crystal Cove State Park strives to incorporate the California Public Schools Science Content Standards in our interpretive programs. We have adapted our programs to embrace these standards.

Kindergarten

Life Science

2. a. Students know how to observe and describe similarities and differences in the appearance and behavior of different plants and different animals.

2. b. Students know that stories sometimes give plants and animals attributes they do not really have.

2. c. Students know how to identify major structures of common plants and animals.

Earth Science

3. a. Students know characteristics of mountains, rivers, oceans, valleys, deserts and local landforms.

Grade One

Life Science

2. a. Students know that different kinds of plants and different kinds of animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.

2. b. Students know both plants and animals need water, animals need food, and plants need light.

2. c. Students know animals eat plants and other animals for food and may also use plants and even other animals for shelter and nesting.

Grade Two

Life Science

2. d. Students know there is variation among individuals of one kind within a population of animals or plants.

Grade Three

Life Science

3. a. Students know that plants and animals have different structures that serve functions in growth, survival, and reproduction.

3. b. Students know examples of diverse life forms in different environments, such as oceans, deserts, forests, tundra, grasslands, and wetlands.

3. c. Students know plants and animals cause changes to the environment in which they live; some of these changes are detrimental to the prganism or other organisms, and some are beneficial.

3. d. Students know when the environment changes, some plants and animals survive and reproduce, others die or move to new locations.

Grade Four

Life Science

2. a. Students know plants are the primary source of matter and energy entering most food chains.

2. b. Students know producers and consumers (herbivores, carnivores, omnivores, decomposers) are related in food chains and food webs and may compete with each other for the resources within an ecosystem.

3. a. Students know ecosystems can be characterized by their living and nonliving components.

3. b. Students know that in any particular environment, some kinds of animals and plants survive well, and some cannot survive at all.

3. c. Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.

Grade Five

Life Science

2. a. Students know many multicelluar organisms have specialized structures to support the transport of materials.

3. a. Students know most of Earth's water is present as salt water in the oceans, which cover most of Earth's surface.

Grade Six

Ecology (Life Sciences)

5. a. Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.

5. b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.

5. c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.

Adaptations of Marine Life In the Intertidal Habitat

Sea Urchin

The **sea urchin** is a slow moving animal with an obvious appearance. It is covered with hundreds of *sharp spines* that serve as an adaptation to discourage many potential predators. As an *herbivore*, the sea urchin has adapted to rocky tidepools by developing five very sharp, hard teeth to scrape minute algae plants off the rocks. It, also, uses its hard teeth to grind away the rocks and *burrow* a home in the rock. It uses the burrowed home along with its long *suction tube feet* and spines to protect itself when the waves come.

Sea Star

Sea stars are often found in the harshest intertidal environment, among the rocks, ocean currents, pounding waves and tidal surge. They have hundreds of *tiny suction tube feet* on the under side of each arm to help them *adapt* by holding on to the rocks against these great *forces*. These forces are so great, and a sea star will cling so tightly, that one or more arms may be torn from its body. Sea stars can *regenerate* new arms and body parts when they are lost in an accident. Most sea stars are *carnivores* and are very slow moving. They have *adapted* by feeding on slow moving shellfish by opening the shells with their strong suction cup feet and inserting their stomachs between the shells to digest the animal.

Sea Anemone

The **sea anemone** *adapts* to its tidepool environment by *disguising* itself as a harmless flower or plant, similar in color and appearance to other marine plants. Actually, the sea anemone is a *predatory, carnivorous* animal. The sea anemone is not a very mobile animal, which is a problem for a predatory animal. The sea anemone *adapts* by developing an attractive crown of *tentacles* with *microscopic barbs* that can *inject* a passing fish or shrimp with a *paralyzing toxin*. It then uses its *tentacles* to drag its *paralyzed prey* into its mouth without moving from its position. The constant surging tides, crashing waves, sun and wind create a harsh *environment* for tidepool creatures. The sea anemone *adapts* by opening its *tentacles* when it is covered with water and closing its tentacles and sucking small pieces if seashells to its outside *tissue*, to protect it from *dehydration and desiccation*, when the water empties from the tidepool.

Sea Hare

The **sea hare** is actually a large snail that has a very thin shell under its skin. It is a very fragile creature but has *adapted* to the tidepools by moving slowly and with subtle *camouflage* coloring that resembles a tidepool rock. Because the sea hare has slow and fragile characteristics, it has adapted to its environment by developing a *defense mechanism* similar to an *octopus*. It can *excrete* purple ink that may *confuse, paralyze* or be *offensive* to a *predator.* As this *camouflaged herbivore* slowly grazes the rocks for algae, it can shrivel up its soft flexible body and tuck itself into small rocky crevices for protection when the tide recedes or the waves are pounding.

Octopus

Octopi are *carnivores* and they eat a variety of crabs, shellfish and small swimming fish. Octopi are not strong swimmers so it is difficult for them to catch fast moving fish. Therefore, they have *adapted* to this *physical limitation* by developing a mouth with a sharp beak, similar to the beak of a parrot. This beak allows them to *bore* a hole into the hard shells of slower moving animals. Another *adaptation* is their exceptional *camouflage capabilities* for hunting prey and evading predators. They can change their *shape and color patterns* within seconds. They can, also, *emit clouds of black ink* to confuse and dull the senses of other sea creatures.

Mussel

Mussels *connect* themselves to a rock or other substrate and cannot move or hunt for food. They are *bivalve filter* feeders of microscopic plankton and other microorganisms that are suspended in the seawater. In order to protect themselves from hungry predators, mussels live in large groups called "mussel beds" and during low tide they close their shells tightly, with water inside, to protect their soft bodies from drying out.

Limpet

Most **limpets** have hard *conical* shells that help them to *adapt* to the *rocky intertidal environment*. They clamp themselves so tightly to large, stationary rocks that it is very difficult to pry them loose without breaking their shell and killing them. By clamping down during low tide, they are able to prevent *dehydration and desiccation* and can live for several days without water. These *herbivores graze* on the large rocks for algae.

Hermit Crab

Hermit crabs are different than most crabs because they have a soft body and no shell of their own. They *adapt* to this *physical disadvantage* by using the *abandoned shells of sea snails* to protect their soft bodies from predators and the harsh tidepool environment.
As scavengers, they will feed on bits and pieces of other creatures and plants including any of their own kind that are too slow in getting into a new snail shell.

Sculpin

Unlike many fish, the **tidepool sculpin** can stop swimming and rest on the rocky, sandy bottom. When they are disturbed however, they quickly dart away. They are tiny 3-5" fishes who are well *camouflaged* and can change their mottled coloring to match the background.

Coralline Algae

This small, low-growing marine plant lives close to the wet rocks which helps it to adapt to the rocky tidepool environment. The plant cells of this algae *secrete* a *hard covering*, resembling coral, and helps protect it from pounding waves, burning sun and desiccation.

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Sea Life that is easy to find - Level 1

Hermit Crab

Barnacles

Rock Weed

Black Turban Snail

Sea Anemones

Sea Life that is easy to find - Level 2

Shore Crab

Sea Lettuce

Mussel

Rough Limpets

Kelp Snail

Sea Life that is easy to find - Level 3

Chiton

Rock Louse

Coralline Algae

Gooseneck Barnacle

Sculpin

Sea life that is hard to find - Level 4

Tube Snail

Sea Urchin

Sea Fingers

Sand Castle Worm

Sea Hare

Sea life that is hard to find - Level 5

Giant Keyhole Limpet

Opaleye

Wavy Top Turban Shell

Purple Olive Shell

Sea Palm

Sea Life that is hard to find - Level 6

Octopus

Ochre Star

Brittle Star

Abalone

Bat Star

Tidepool Tidbits

What force causes the ocean's high tide and low tide? _____

_____

How many oceans are there in the entire world? _____

Name three animals found in the tidepools.

1. _____

2. _____

3. _____

What animal looks like a flower and eats tiny fish? _____

What do we call an animal that eats other animals? _____

What can a sea star do if it loses an arm? _____

What animal is a scavenger and lives inside the abandoned shell of a sea snail?

_____

What animal squirts a cloud of ink to distract and confuse a predator?

_____

Why does a sea anemone attach small pieces of broken seashells to its outside covering?

_____

How many overlapping plates does a chiton have? (Pronounced "kyton") _____

What is one of the biggest problems that harm tidepools animals? _____

_____

Draw a picture of your favorite tidepool animal.

Hold On Tight! *(Adapted from Aquarium of the Pacific)*

Objective: To learn about the adaptations that allow tidepool animals to hold on tight as waves push and pull against them.

Background: Waves that crash upon a rocky shore constantly beat on the animals that live there. Tidepool animals have developed a variety of adaptations that allow them to hold on tight to keep the waves from washing them out of their habitat.

1) Discuss the tidepool habitat and explain that ocean waves are constantly threatening to pluck marine animals from the rocks as water and rocks crash upon them.

2) Have students imagine that they are tidepool animals and that waves are continually washing over them. Ask how they would hold on so that they would not be dislodged and washed ashore or out to sea. What tools might they use to keep themselves secure?

3) Show students pictures of the tidepool animals and explain that each of them has developed a different way of holding on to the rocks. Show students the tools (string, suction cup, glue, tape, tweezers) and ask which tool would best represent each tidepool animal's adaptation for holding on.

• String is similar to the mussel's byssal threads — thin, strong, string-like material used to anchor its body down.

• The suction cup is similar to the tube feet on echinoderms — sea stars, cucumbers, and urchins — and very like the strong suction cups on the arms of an octopus.

• The glue is like the waterproof substance that barnacles use to attach their heads to a rock.

• The tape is similar to the sticky foot on sea snails and anemones.

• The tweezers can be compared to the pointy appendages of a crab.

Additional Activity:

• Have students work in groups to role-play different animals. This will show how animals have unique adaptations to help them survive. They will look at pictures of each animal and watch as the animal's behavior is demonstrated. They will then act out the behavior of the animal during high tide and during low tide and explain why this behavior is needed.

For example, in the sea anemone role-play at high tide, have the students work in groups of three. They need to stand facing each other. When the tide is high, they will put their arms up and wiggle their fingers to feed.

At low tide the anemones will pull their tentacles into their mouth. The students can pull their arms in and cover their heads for protection.

Marine Mammals

Mammals have hair or fur.
Mammals have lungs to breath air.
Mammals give birth to live babies.
Mammals have mammary glands to feed and nurse their young with milk.
Mammals are warm blooded.
Mammals have a backbone or a spine.

Sea Otters have the thickest and most dense fur of any mammal. The otter's dense fur was so much in demand for fur coats that they were almost hunted to extinction. The sea otter is a Pacific Ocean mammal that used to thrive from the southern coast of Baja California to the cold northern coasts of Alaska and Russia. The fur hunters killed so many otters that they are no longer found south of the central California coast. The loss of these friendly creatures has caused a serious imbalance in the marine life of southern California and threatens the California giant kelp. One of the favorite foods of sea otters is sea urchins, which are one of the worst enemies of a kelp forest. When the sea otter left, the urchins thrived and are contributing to the decline of the kelp forests. Other favorite foods of these delightful mammals are shell fish, crustaceans, squid, octopus and fish. They eat, rest and sleep while floating on their backs and surrounded by a kelp bed.

Seals use their rear flippers to push them when they swim while their short front flippers are used for steering. Seals are unable to walk on land and instead use their front flippers to crawl or wiggle along on the rocks or on the sandy shore. Seals do not have visible ears but they do have small holes in the side of their head for hearing. They eat squid, many kinds of fish and other sea creatures. The largest seal found in our area, the elephant seal can reach up to 16 feet (females are smaller) and weigh as much as 5000 pounds. Elephant seals, so named because of their size and long pendulous nose, spend most of their lives at sea, coming ashore only to molt, give birth, and mate.

Sea Lions use their very large front flippers to push them through the water while their rear flippers are used to steer, like the rudder on a boat. They can use their rear flippers to walk on land, to hike on rocks and up the side of large cliffs. Sea lions have small, shaped ear flaps on the side of their head. They are carnivores who hunt and feed on fish such as salmon. They are very intelligent and will steal fish from fishing nets, lines and traps. Sea lions have a very loud bark, similar to a dog and are often seen sunning themselves on buoys in the harbor.

Bottlenose Dolphins, humans and chimpanzees are the most intelligent animals on Earth. Bottlenose dolphins are often seen very close to the shore, either feeding, swimming, or surfing in the breaking waves. Dolphins are a type of toothed whale, having one blowhole and who use echolocation to find their food. Bottlenose dolphins have up to 100 sharp teeth and eat mostly fish, squid and crustaceans. They often hunt together as a team, and are very sociable animals that travel together as families, and are very friendly with humans. They use their tails, called flukes to swim extremely fast and to jump very high. These animals are often seen at Crystal Cove State Park and have been observed giving birth in the inshore coves.

Gray Whales are often seen along the coast of California as they migrate, back and forth, between their feeding grounds in the Artic to their breeding and birthing grounds in the warm waters of Baja California. Every other year, these animals, who can reach 50 feet and weigh 35 tons, give birth to a 1500 pound baby who nurses for nine months on milk so rich the babies can gain 1000 pounds per month. Grey whales are filter feeders who instead of having teeth have large baleen plates hanging from their upper jaw which filter tiny organisms called amphipods from the ocean bottom. Gray whales were hunted to near extinction after discovery of their calving lagoons, but due to various international laws, they are protected and were removed from the Endangered Species list in 1994.

Blubber Gloves

MATERIALS: Crisco, heavy-duty Zip-lock bags, spatula, duct tape, bucket, ice, water

Objective: To demonstrate the insulating properties of blubber.

Background:
Marine mammals — from the small harbor seal to the largest animal that has ever lived, the blue whale — all face the challenge of being warm-blooded creatures living in the cold ocean. To help stay warm, many of these animals have a thick layer of blubber that insulates them from the cold. This layer of blubber also provides buoyancy, helping these marine mammals float easily. When food sources are scarce, the thick layer of blubber can be used as an energy reserve. Blubber also streamlines their bodies, making it easy for them to glide through the water.

Procedures:
1 Scoop a generous amount of Crisco into a zip-lock bag. Spread the Crisco evenly along the sides of the bag.

2 Turn a second zip-lock bag inside out and place in the first bag. Make sure that the zip-lock sealers lineup.

3 Seal the tops together with the layer of Crisco in between the bags, creating an insulated glove.

4 To ensure that the seals stay closed, duct tape the tops of the bags together, leaving the center open for a hand to slip in.

5 Explain to students that the fat (Crisco) lining the glove is like the layer of blubber under the skin of whales, seals, and sea lions.

6 Fill a large bucket with ice and water. Have pairs of students compete to see who can hold his or her hand in the water the longest — the student wearing the blubber glove or the student with just a bare hand. Have students predict results.

7 Ask which hand stayed warmer and why. Discuss with students how useful blubber is to the marine mammal.

Learning Extensions:
• Explore the idea of thermoregulation in sea otters, which use dense fur as an insulating layer instead of blubber. Have students create a fur glove by gluing fake fur to a zip-lock bag. Test the insulating ability of this glove in the ice water. Then add bubble wrap in between the fur and another plastic bag and test the glove again. Discuss why adding the insulating air increases the efficiency of the fur glove.

• Demonstrate how marine birds use feathers as insulation by adhering feathers to a zip-lock bag. Test this glove, with and without the layer of bubble wrap.

Migration

The driving force behind animal migration is survival. Feeding and breeding are the main reasons that animals migrate and many will migrate incredibly long journeys to find food or a safe place to breed and raise their young. Animal migration is usually from one region to another, and then back again, often in the same period of a time cycle. This round-trip, or return migration, may be of a seasonal nature, as in the spring and autumn migrations, or it may require a lifetime to complete. They usually follow the same, well-defined migration routes.

Bird Migration

When the days become shorter, the weather cooler, flowers are no longer in bloom and insects are hard to find, most North American hummingbirds fly south for the winter. In order to find abundant nectar and insects, they set sail for warmer locations and may fly at 25 miles per hour to reach their destination. It can be a frightening journey for these powerful and agile flyers since they don't necessarily know where their next meal will be found. Therefore, they must increase their fat reserves as much as possible before migrating. A stop here at Crystal Cove State Park may provide them with some of that energy. We are fortunate to enjoy the antics of five species as they either nest or migrate to their wintering grounds in Mexico and Central America. Of all the hummingbirds, our own Rufous makes the longest migration by flying from Mexico to Alaska, about 3000 miles each way!

Butterfly Migration

Monarch butterflies start their migration in early fall from as far away as the northern Rocky Mountains in Canada. Some will migrate as far south as Central America. Monarchs form clusters, sometimes numbering in the thousands, as they fly day and night, following the warmer weather and the flower blossoms which provide nectar for food. Monarch butterflies cannot survive a long cold winter. Instead, they spend the winter roosting in warmer areas. Monarchs west of the Rocky Mountains travel to small groves of trees along the California coast whereas those east of the Rocky Mountains fly farther south to the forests high in the mountains of Mexico. The Monarch's migration is driven by seasonal changes, day length and temperature.

When they reach their destination they will mate and lay eggs which turn into caterpillars. The Caterpillars will feed on milkweed and then form a chrysalis. A new Monarch butterfly will emerge from the chrysalis in about two weeks and will then start its migration back to the northern climates, following the spring growth of the milkweed.

Whale Migration

The California Gray Whale has the longest migration of any mammal. They migrate nearly 12,000 miles round trip from Baja California to the Bering and Chukchi Seas in the Arti Ocean. While in their Arctic feeding grounds, the whales will eat up to 2,000 pounds of amphipods tiny shrimp-like creatures each day. During the migration and while in their breeding grounds gray whales do not eat so it is vital for them to store enough energy to withstand the arduous journey back and forth. Around October, when the food supply lessens and the days get shorter, gray whales instinctively begin migrating south. They will spend the winter in the warm lagoons of Baja California where some will mate and others will give birth to calves weighing 1,500 pounds or more. A calf is born without much blubber so it is a race for it to gain enough fat so that it may make the journey north. They start their return trip back to the Artic in early spring.

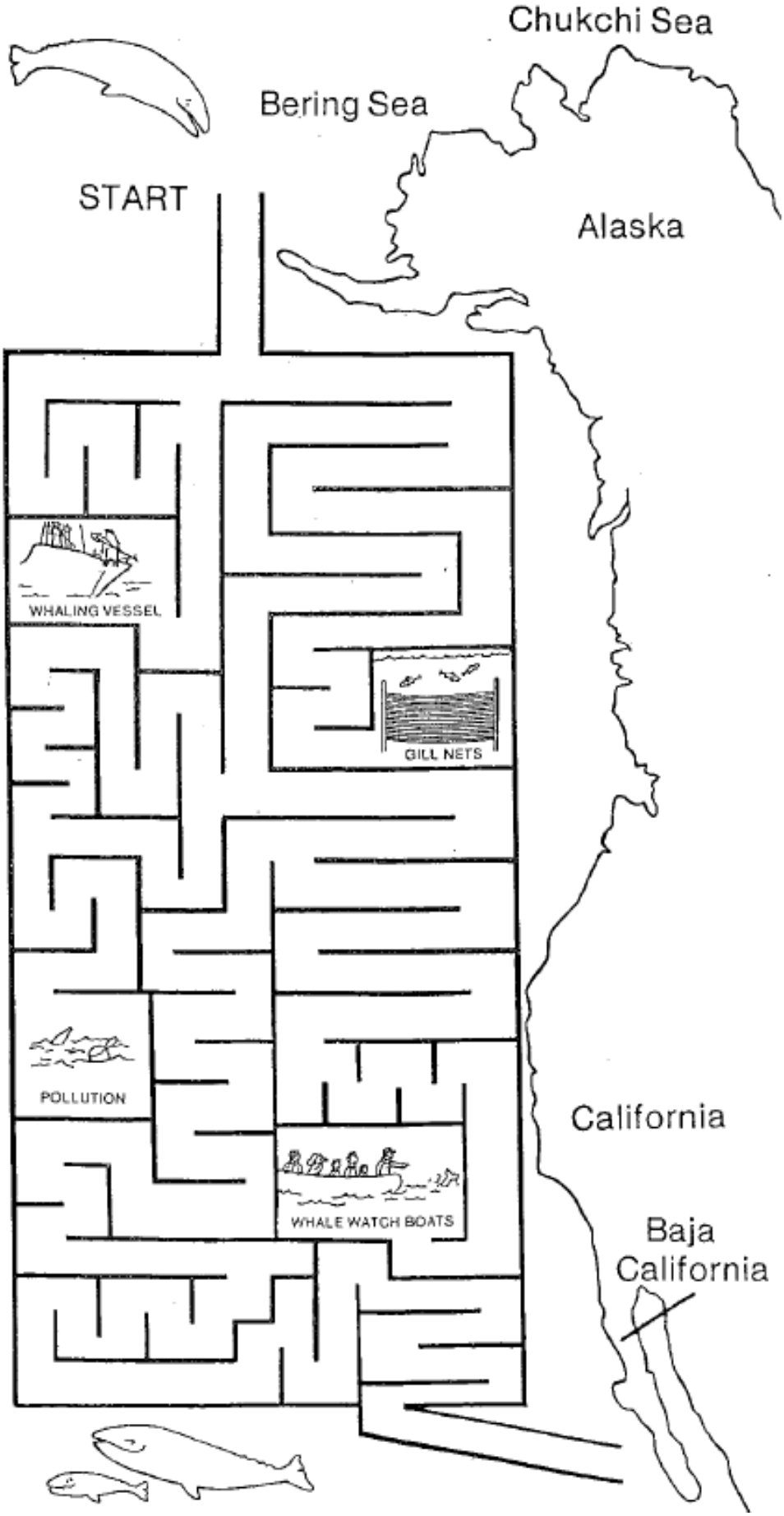
The aMAZEing Grey Whale Migration

Each fall, Pacific gray whales begin a long journey south from cold Arctic waters.

They head for the warm, protected waters of the lagoons in Baja California. Here they mate and give birth.

In the spring, the gray whales return north. During the summer, the whales feed on the many tiny animals that live in Arctic oceans.

Help the gray whales find a safe route south.



Endangered Species

Endangered animals and plants are those that scientists know are in the most immediate danger of becoming extinct.

All animals and plants are linked together. Each species plays a role in keeping the world of nature alive and in balance. Every species depends on other species. When a species disappears or becomes extinct, the balance shifts and will affect all of the other species in some way.

The loss of habitat is the most serious threat that endangered animals face today. When they lose places to live, hunt food, and raise their young in safety, the population of that species declines and becomes endangered. As the number of people, houses, farms, and factories grows, animal habitats shrink or disappear. Water pollution is, also, a serious threat to a healthy animal habitat.

Grizzly Bear

Although grizzly bears are not extinct worldwide, in California, where they are the state symbol, they have been gone since 1922. Before dying out in California, this largest and most powerful of carnivores thrived in the great valleys and low mountains of the state for centuries. Some grew to a formidable height of 8 feet and weighed as much as 2,000 pounds. When European immigrants arrived in the state, it was estimated that 10,000 grizzlies inhabited most regions of California. As California became more populated, new settlers began to crowd the areas that the grizzly inhabited. The awesome animals stood their ground and refused to retreat in the face of the advancing civilization. Once they began preying on livestock and interfering with the settlers however, they were hunted and killed.

Pelican

California Brown Pelicans are a magnificent species of bird frequently seen flying along the shore at Crystal Cove State Park. These birds were almost exterminated from the California coastline however as they fell victim to DDT, a type of chemical which fouled the ocean and poisoned the fish that the pelicans ate. The chemical was responsible for harming pelican reproduction by causing egg shell thinning and consequential collapse of the egg and chick. The effects were disastrous to the species who were listed as federally endangered in 1970. Since the ban on DDT, the California Brown Pelican has nearly recovered but now face current threats to the population including pollution, human disturbance of breeding colonies, loss or serious decline of food fishes to human over-fishing, and fishing gear entanglement.

Snowy Plover

The Western snowy plover is a threatened species and is protected by the Endangered Species Act. Human use of their beach habitat seriously threatens their survival. There are fewer that 1500 breeding snowy plovers left in California. This sparrow-sized shore bird blends in with its environment so well that they are extremely hard to see. It is very easy for their nests and habitats to be disturbed or damaged by unsuspecting visitors, dogs, cats and other predators. Their known nesting areas, found on flat, open coastal beaches and sand dunes, are sometimes fenced and closed off to try to protect their habitat and ensure their survival.

California Gray Whale

Future survival looks uncertain for some whale species, but we have seen glimmers of hope. One such success story features the California gray whale, twice hunted to the brink of extinction during peak whaling years for all parts of their giant body. Legally protected since 1946, gray whales have made anastonishing comeback. Gray whales currently number about 21,000, an estimate scientists believe matches the pre-whaling population. California gray whales were removed from the Endangered Species List in 1993.

Habitat Lap Sit (Adapted from Council for Environmental Education)

Objective: To identify the components of habitat, recognize how humans and other animals depend upon habitat, and interpret the significance of loss or change in habitat in terms of people and wildlife.

1) Number off students from "1" to "4" and separate each number into its own group area.

2) As the students are separating, clear an area in the center of the classroom or move outside.

3) Assign each group a habitat concept as follows:

Ones=food
Twos= water
Threes=shelter
Fours=space

4) Now build a circle based on chains of food, water, shelter, and space. One student from each of the four groups walks towards the center, standing next to each other and facing in towards the center of the circle. Four more students (one from each group) join the circle, and keep adding students until all the students are in the circle.

5) Ask the students to turn to their right and take one step in towards the center of the circle. They should all be looking at the back of the head of the student in front and standing closely together.

6) Ask everyone to **listen carefully**: Students should place their hands on the shoulders of the person in front of them. Students slowly sit down as you count to three, and should be sitting down on the knees of the person behind them when you reach three. Knees should be held together to support the person in front of them. You then say "Food, water, shelter, and space—in the proper arrangement (represented by the students' lap-sit circle)—are what is needed to have a suitable (good) habitat."

7) At this point, the students may laugh or fall down. After everyone has calmed down, discuss with them the necessary components of habitat for people and wildlife.

8) After the students understand the major point, try a different variation of the activity. Ask the students to reform their circle and hold their lap sit posture, still representing food, water, shelter and space in the proper arrangement, and identify a student that represents water. Say something like, "It's a drought year. The water supply is reduced." At this point, have the student that was identified remove themselves from the circle, and watch the circle collapse or suffer some sort of disruption. Conditions could vary: pollution in water supply, urban sprawl limiting availability of all resources, soil erosion impacting food and water supplies, etc. Removal of any of the components will have an impact as all components are equally important to an animal.

9) Ask the students to discuss what this activity means to them. Ask students to summarize main ideas they have learned.

What Is A Mammal?

Mammals have hair or fur and lungs to breathe air.
Mammals give birth to live babies and feed and nurse their young with milk.
Mammals are warm-blooded and have a backbone or spine.

- Mammals you might see at Crystal Cove include coyotes, bats, and grey whales.

What Is A Reptile?

Reptiles have dry, rough scaly skin and lungs for breathing.
Reptiles are cold-blooded and have backbones.
Most reptiles hatch from eggs.

- Reptiles you might see at Crystal Cove include fence lizards, rattlesnakes, and rosy boas.

What Is A Bird?

Birds have feathers and are warm-blooded.
Birds hatch from eggs.
Birds have backbones, beaks, two legs, and two wings.

- Birds you might see at Crystal Cove include red-tailed hawks, hummingbirds, and pelicans.

What Is A Fish?

Fish live in water and breathe through gills.
Fish have backbones.
Most fish have fins and are covered with scales and are cold-blooded.

- Fish you might see at Crystal Cove include opal eye perch, leopard sharks, and garibaldi.

What Is An Insect?

Insects are small animals with six legs.
Insects' bodies are divided into three main parts: head, thorax, and abdomen.
Insects have a hard outer layering called an exoskeleton, wings and a pair of antennae.

- Insects you might see at Crystal Cove include the harlequin beetles, stink bugs, and spittle bug.

What Is A Spider?

Spiders are silk spinning animals with eight legs and eight eyes.
Spiders' bodies are divided into two main parts: abdomen and cephalothorax.
Spiders have a hard protective covering on its body called an exoskeleton.

- Spiders that you might see at Crystal Cove include black widows and orb spiders.

What Is An Amphibian?

Amphibians usually live part of their life in water and part of its life on land.
Amphibians are cold-blooded and have a backbone.
Most amphibians have smooth, moist skin and no scales.

- Some amphibians you might see at Crystal Cove include pacific tree frogs and spade foot toads

What Animal Am I? (adapted from Joseph Bharat Cornell)

Objective: Learn and identify different local animals and their characteristics.

Procedure:

1) Print out or cut out before hand a few pictures of local animals. Some possibilities include the monarch butterfly, mule deer, raccoon, gray whale, seal or sea lion, owl, red tailed hawk, vulture, etc…

2) Choose one student to stand in front of the class. Without showing the student, tape a picture of an animal to their back. They then ask yes or no questions to the rest of the class to guess what the animal on their back is, much like 20 questions. Examples include, "Do I live in the ocean?"

3) After the correct animal identity is guessed, choose a new student and a new animal.

Adaptations

All living things need four things to survive: food, water, shelter, and space. Not all of these are readily available in an animal's habitat, so in order to survive the animal has to adapt. An adaptation is a characteristic that allows an animal to survive in its environment.

Adaptations can be something physical like a structural part of its body or a physical characteristic, like a color or shape (for example, we use our hands to pick up our food). Adaptations can also be behavioral so that the way it acts helps the animal survive (frogs jump to catch their food).

Physical adaptations:

- Eye position: an animal that hunts other animals has eyes on the front of its head while an animal that is hunted has eyes on the side of its head or on top.
- Ears: an animal can have big ears to help it hear prey
- Color: animals can have coloring to help it camouflage so it can hide easier from predators
- Teeth: Carnivores have sharp pointed teeth to help tear meat and catch prey while herbivores have flat teeth with ridges to help grind up plants
- Spines: Plants like the cactus have adapted their leaves into spines to stop animals from eating it and to limit water loss

Behavioral adaptations:

- Nocturnal vs. diurnal: Owls hunt at night to catch small animals that are active at night
- Stealth: Bobcats sneak up and pounce on their prey
- Migration: Some animals migrate to find food or water or a more suitable shelter.
- Shelter: Some animals build burrows or nests to stay warm and/or raise young
- Diet change: Some animals eat different things during different seasons.

Crystal Cove State Park provides habitat for the following animals:

Owls have many structural and behavioral adaptations. The feathers along the bottom of their wings are serrated, allowing them to be virtually silent as they fly though the air. They have large eyes that help them locate prey and have a hooked, pointed beak and sharp talons to help it catch and eat its prey. They hunt at night to catch other nocturnal animals and use their hooting to locate other owls.

Skunks have a striped pattern which helps them camouflage in the shrubs and brush and serves as a warning to potential predators to keep clear. Their eyes are on the sides of their head so they are more aware of approaching predators. Their most famous adaptation of spraying serves them quite well; after warning predators by lifting their tail, skunks will then let loose a stream of sulfur-containing chemicals, which are strong enough to scare off a bear! They dig around using their large claws, hunting for insects and grubs.

Bobcats are one of the most adapted predators at Crystal Cove. Their spotted coloring allows them to easily camouflage in the surrounding bushes and shrubs. They have eyes located on the front of their head so they can focus on prey and sharp teeth to help them catch and eat their prey. They can silently sneak up and then pounce quickly on prey. They also need territories of about 15 square miles to make sure that they get enough food.

Quick Frozen Critters (adapted from Council for Environmental Education)

Objective: To discuss predator/prey relationships and the importance of adaptations in these relationships and recognize that limiting factors such as predator/prey relationships affect wildlife populations.

Procedure:

1) Identify students as either predators or prey for a version of freeze tag. You'll want about one predator to every four-six prey. Ideas:

Prey	Predator
Cottontails	Coyotes
Ground Squirrels	Hawks
Deer	Mountain Lions
Quail	Bobcats

2) Set up the field. One end should be designated the "food" end and one end is the "shelter" end. Create four or five circles between the two ends (using hula hoops,rope, chalk, etc.); this represents temporary shelter for the prey. Place food tokens in the "food" zone. Allow for three tokens per animal (you can use cardboard). Predators should be identifiable (vests, sashes, etc.).

3) When a round begins, prey start from the "shelter" zone. Their job is to collect three food tokens in order to survive. Only one token may be collected per trip. However, they must be aware of the predators! If a predator is spotted, they can either "freeze" or run to the "shelter" zone or a temporary shelter.

4) Predators can start the round anywhere in the open area between the two zones. Predators need to capture two prey animals in order to survive. They can only tag moving prey/ Captured prey are then taken to the sidelines by the predator that captured them for the rest of the round. One hand tag or other ground rules may be useful.

5) A time limit of 5-7 minutes is recommended for each round. It may be necessary to remind prey that they might not be able to get enough food tokens if they are frozen the whole time. Play around four rounds so each student has a chance to be predator and prey.

6) Discuss which way was easiest to escape predators and which was most effective. How did they go about capturing prey as a predator? Which ways were best? How did predators react to animals that froze? How are adaptations important to both predator and prey? How do predator/prey relationships serve as natural limiting factors affecting wildlife?

Marine Debris

California's waterways and coastline are used and enjoyed everyday by millions of people, but many don't realize how everyday activities such as driving a car, not properly throwing out trash or tossing a cigarette butt out the window can have impacts to the plants and animals along our coastline. This debris not only make the beach less enjoyable for humans but can also harm or kill beach organisms. Solving the problem of marine debris requires everyone to pitch in!

Starting Point
Snow and rain falling on the mountains starts the watershed that flows through the canyons, hills, valleys, towns, and urban communities, all which are higher than the ocean. The streams and rivers flow directly to the ocean, but are often accompanied by unwanted debris. Additionally, anything that makes its way into the gutters and storm drains also flows into the ocean. Marine debris often starts in our own communities when trash such as plastic bags, cigarette butts, and soda cans are carelessly discarded in the streets, sidewalks, parks, and in playgrounds.

Traveling Debris
Marine debris includes all the objects found in the marine environment that do not naturally occur there. Although items such as tree branches and the bones of land animals can be considered marine debris, the term generally is reserved for trash. The most common categories of marine debris are plastic, glass, rubber, metal, paper, wood, and cloth. The wind and the rain move this debris into the storm drains which lead to the ocean. A plastic sandwich wrapper dropped on the playground, chemical fertilizer on the lawn, paper cups thrown in a parking lot, dog waste in the park, and a plastic water bottle left on the curb all will eventually be deposited in the ocean. Unfortunately, the most plentiful item found on the beaches are cigarette butts. "Fish don't smoke" yet this type of dangerous trash is found in quantity along our coastline.

Harmful Effects
The two primary problems that marine debris poses to wildlife are entanglement and ingestion. Marine mammals, turtles, birds, fish, and crustaceans all have been entangled in or have eaten marine debris. Many of the species most vulnerable to the problems of marine debris are endangered or threatened. Entanglement results when an animal become encircled or ensnared. Entanglement can occur accidentally, or when the animal is attracted to the debris as part of its normal behavior or out of curiosity. Common items like fishing line, strapping bands, and six pack rings are some of the dangerous culprits. Once entangled, animals can have trouble eating, breathing or swimming, all of which can eventually kill them. Ingestion occurs when an animal swallows marine debris. Ingestion sometimes happens accidentally, but generally animals feed on debris because it looks like food. Ingestion can lead to starvation or malnutrition if the ingested items block the intestinal tract and prevent digestion, or accumulate in the digestive tract and make the animal feel "full," lessening its desire to feed. Some birds even feed this false food to their young.

People who use the seashore for recreation are also often harmed by the affects of marine debris and other types of pollution. Beach-goers can cut themselves on glass and metal left on the beach. It is also very discouraging for humans to be confronted by dog waste, cigarette butts, and popped balloons, to name only a few, while enjoying a day at the beach or swimming in the ocean.

Ecology of Crystal Cove

There are many animals that live in the back country of Crystal Cove State Park. From tiny bugs, to colorful hummingbirds, to the majestic mountain lion, animals of all shapes, sizes, and colors inhabit the park. Most of the time we don't see the animals themselves, rather we see signs of their existence. Some types of clues or animal evidence we find include:

Tracks: Animals leave tracks in the soft dirt and sand along the trails in the back country. The best time for tracking however, is after a rain when the mud is wet and the tracks are firmly imprinted. Animals such as bobcats, snakes, bugs, birds and coyotes leave distinctive paw prints or slither marks that we can distinguish from one another. We can gather all sorts of information from tracks including: the type of animal, how long ago it was there, if it was alone or part of a group, if it was healthy or injured, even the gender.

Scat: One of the best clues that indicate the presence of an animal is scat. From scat, we can tell what kind of animal left the poop, what they were eating, if the animal was healthy, how long ago they were there, and other things about our park, such as what might be ripe in the park or what may be abundant.

Leftovers: Many predators don't eat their prey in entirety, leaving behind bones and other "hard" evidence. From these leftovers we can often determine how an animal died, perhaps what ate it, and sometimes how long ago it happened. We can also gather evidence from other "leftovers" like fur, feathers, claws and talons. Owl pellets indicate what these nocturnal birds of prey are eating and perhaps what prey items are plentiful in the park. Other times we find things like partially eaten leaves. These could be from insects, rabbits, deer, or other herbivorous animals.

Calls: In addition to the visual clues we find in the backcountry, sounds are another indication of an animal's presence. Many of the animals can be distinguished by the noises they make. Bird can be identified exclusively by sound, and many birds have a repertoire of calls from alarm calls to hunger and mating songs. Other typical sounds include the howling of coyotes, the hooting of owls, and even the noise made by snakes as they slither through the brush.

Homes: We can often tell where an animal has been living. Sometimes we find their dens in low brush or in hollowed out bushes. We see holes in the ground where snakes hibernate and rest or those used by small animals. We can find bird nests in the trees and spider webs on bushes throughout the park. We find holes in wood a sign of an insect's home and galls on leaves that are the homes for wasps.

Other Signs: Animals leave other clues that let us know they were there. A big clue is broken brush. Often when an animal is moving through an area with a lot of brush, their weight will push it down and will stay flattened for up to a few days. Sometimes this can be so clear you can follow an animal's path up a hillside and to its favorite eating spot!

Marine Animals and Marine Debris

1. Place the items of debris on the floor in the middle of the classroom and have students form a circle around them. Have a volunteer read the description of the seal. Then choose a volunteer to be a seal and ask the person to go to the center of the circle and pick up an item of debris that might be harmful to a seal. Ask the "seal" to tell how and why it might become injured by this piece of debris.

2. Repeat this procedure for the remainder of the animals. After you have finished, ask students if they can associate any other pieces of debris with one of the animals in a way that the class has not yet discussed.

3. Explain that many species of mammals, sea turtles, birds, and fish that encounter marine debris are endangered or threatened. Ask students how marine debris could pose special problems for these species. End your discussion by helping students to understand that any animal that lives in the water or on the coast can be affected by marine debris.

Seagull I look for food in the piles of sea weed and shells washed up by the tide. If I can, I'll eat food that has already been caught by someone or something else. I also like to eat fish eggs, which are round and clear.

Seal I am naturally curious and like to play with unusual objects, especially those that float. My nose is perfect for poking into things – but sometimes I get caught.

Fish I often swim into holes and near objects that offer shelter from my enemies. If a lot of smaller are gathered in one area, I may swim closer to see if I can eat them.

Turtle One of my favorite foods is jellyfish, which floats on or near the surface of the water. Jellyfish swim in schools, and you can see right through them!

Lobster I crawl along the bottom of the ocean looking for food. Sometimes I find a tempting meal inside a wooden crate resting on the ocean floor – but once I get into the crate, I can't get out again.

Crystal Cove State Park Backcountry Scavenger Hunt

Many types of animals inhabit the backcountry including reptiles, amphibians, mammals, and birds. It is always exciting to see animals in their natural environment, but often, when an animal hears or senses what they think is a predator, they run, hop, slither, or fly away. Instead of seeing animals themselves, we are more likely to see evidence that animals live in the park. See how many different signs you can find as well as other "treats" of nature.

_____1. A track or footprint?

_____2. A hole?

_____3. A bird feather?

_____4. Broken branches?

_____5. A leaf that has fallen from a tree?

_____6. Something fuzzy, furry, or prickly?

_____7. A bone?

_____8. Something beautiful?

_____9. A seed?

_____10. Scat (or animal poop?)

_____11. A shrub with berries? Which animals may eat these berries?

_____12. A nest or egg?