

SEA TURTLE DISCOVERY

Use your imagination to take yourself on a virtual field trip with Ocean Connectors!



On our drive into the Sweetwater Marsh National Wildlife Refuge this morning, take a look outside the bus windows.

A Wildlife Refuge is a protected place for plants and animals, managed by the U.S. Fish & Wildlife Service.

Notice how high the tide is right now. It is almost right up to the side of the road!



We can see the saltwater flowing into the wetland from the ocean. We will talk more about this later so for now just take a close look.

What else do you notice about this area?



We've arrived at the entrance. Welcome to [Living Coast Discovery Center!](#)

We will be learning about many different types of native animals on this field trip, including sea turtles, so get your journal out and be ready to take some notes.



Remember “Finding Nemo” the movie? Draw Nemo or Dory in your journal. Dory is a blue tang and Nemo is a clownfish. Both of these fish are saltwater fishes that live around coral reefs.

A coral is actually a small living animal that creates a hard shell. The beautiful colors we see come from microscopic algae that grow on the coral.



We are going to start by visiting the turtle lagoon. We will practice our observation skills here like a real scientist.

What does it mean to make observations?

How can observing something be helpful to scientists?

Write your answers down.



How many sea turtles do you see here? What kind of sea turtles do you think they are?

Take a close look at this turtle and make some observations of your own. Describe it and write down any questions you may have about sea turtles.



These are green sea turtles, one of 7 species of sea turtles in the world. All 7 species are threatened or endangered.

Do you remember the names of all 7 sea turtle species? If not, take a look back through your notes.



Green sea turtles get their name because as adults they love to eat green things like sea grasses and algae. They eat so much green stuff that the fat inside their body turns green!

Each type of sea turtle has a favorite food. Some sea turtles love to eat fish, sea jellies, and shellfish.



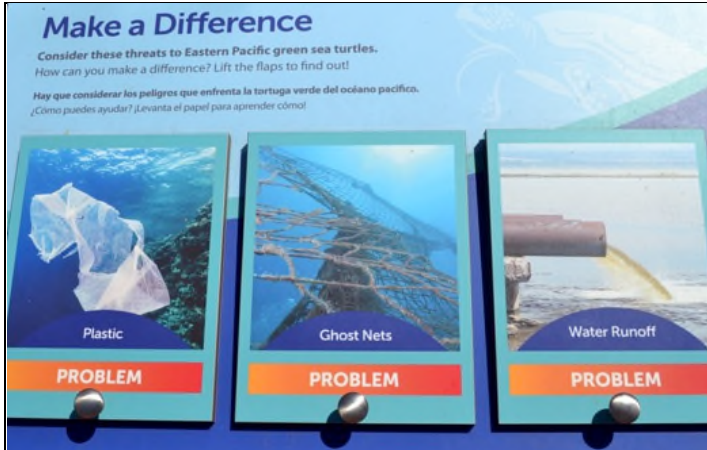
Spot
The Difference

What do you think a sea turtle does when it encounters plastic in the ocean? Leatherbacks and green sea turtles often mistake plastic as a sea jelly, one of their favorite treats.

¿Qué crees que hace una tortuga al encontrarse un plástico en el océano? Las tortugas laúd y verde a menudo confunden el plástico con las medusas, una de sus comidas favoritas.

Plastic can be a big problem for sea turtles. Look how a plastic bag (right) looks like a sea jelly (left). Sea turtles can't tell the difference and eating plastic can kill them.

There is a simple solution for this. Just try to use less plastic. Cut down on plastic bags, bottles, and utensils. It's that simple!



Plastic isn't the only problem for sea turtles. Turtles are affected by other types of pollution as well.

Sea turtles can get caught in abandoned fishing nets, called "ghost nets". Fishing nets can hurt turtles or prevent them from being able to swim to the surface for air, causing them to drown.



How do you think using reusable shopping bags, instead of single-use plastic bags, can help save sea turtles?

What other types of reusable items can we use?

Write down a pledge to use less of one type of plastic.



The compost garden is a great area to learn how to make your own garden at home. Compost is made of natural materials (apple cores, orange peels, yard clippings) as they decay to create nutritious food for plants. This is an example of food recycling.

Bins of compost-in-the-making decay in large containers with heat from the sun and special bacteria.



Next we are going inside the shark and ray exhibit. We may be able to touch some of the animals in this area, so there are some very important rules.

Any time we touch an animal we need to use a gentle two-finger touch, so that we don't harm or startle the animal. Avoid touching anywhere near their eyes. Never try to touch animals in the wild.



There are many different species of sharks, rays, and skates in the world.

These are all types of "cartilaginous" fishes, which means their skeleton is made of cartilage instead of bone. Touch your ear or nose. That is cartilage too!



After rinsing your hands off with water, reach in and try to touch that bat ray! But wait! Can't some rays sting you?

The rays in this exhibit have had their stinging barb removed. Don't worry, it doesn't harm them. Tap on your fingernails. Our nails and hair are made of keratin, the same material stingray barbs are made of. Removing the barbs is like getting your nails clipped or getting a haircut.



It is always good to be a little careful when you are at the beach. Look at how easily these stingrays blend into the sand. That's called "camouflage". If you don't see a ray, you might accidentally step on it and get struck by its barb.

Practice the "stingray shuffle" at the beach; shuffle your feet through the sand to startle any animals that may be resting there, instead of stomping your feet through the water.



These are empty horn shark egg cases! Notice how they have a spiral shape. This shape lets the sharks wedge their eggs into rocky crevices to keep them safe and hidden from predators.

Describe what they look like in your notes.



Can you spot the difference between these two animals?

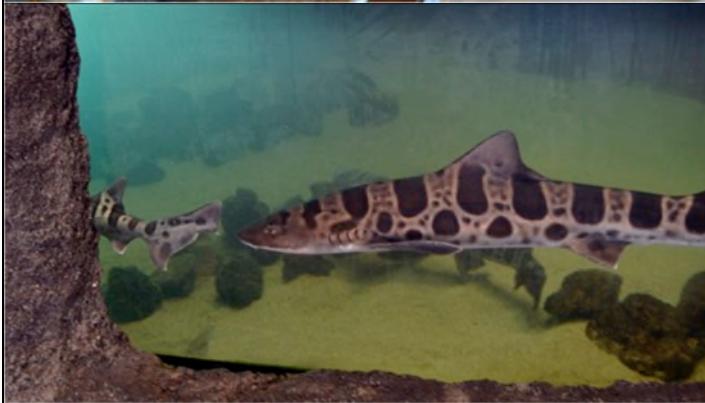
The one on the left is called a skate and the one on the right is a ray. What differences do you notice?

Skates have stocky tails without a stinging barb, and usually with two small fins on top.



Now that we've had an opportunity to touch and see these cool critters up-close, let's continue to learn more about sharks and sea turtles.

Many people misunderstand sharks. Sharks shouldn't be feared because they are an important part of the ecosystem, helping to keep oceans in balance by scavenging on sick and dying prey.




Take a close look at this leopard shark, and sketch it in your journal. Don't forget the gills on the sides of its head.

Why do you think leopard sharks have spots?

Breathing Respiración


Sharks and rays, like other fishes, must remove oxygen from water in order to breathe.

Los tiburones y las rayas, como otros peces, deben obtener oxígeno del agua para poder respirar.



Sharks take water into their mouths as they swim, forcing water over the gills where oxygen is absorbed into blood vessels.

Los tiburones introducen agua dentro de su boca conforme van nadando, forzando el agua a través de las branquias donde se absorbe el oxígeno dentro de los vasos sanguíneos.



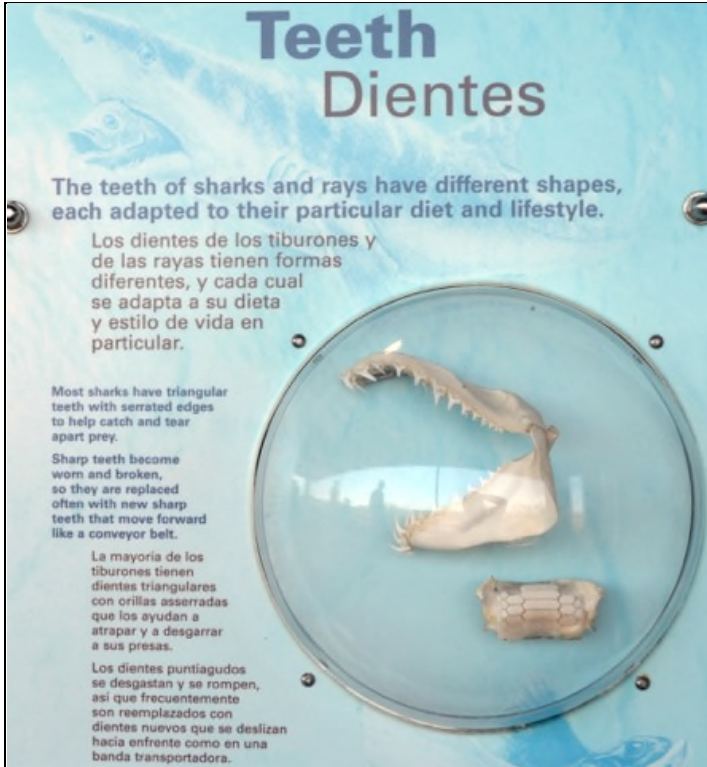
Rays and guitarfish take in water through openings on the top of their heads called "spiracles."

LOOK for the movement of the spiracles in the rays and guitarfish.

Las rayas y los peces guitarra toman agua a través de orificios llamados, "espiráculos" los cuales se encuentran sobre su cabeza (detrás de los ojos).

Sharks, rays, and skates look similar, but their bodies are shaped differently and they also breathe differently.

Sharks swim forward and pump their mouth so water enters, and the dissolved oxygen in the water is absorbed through their gills, giving them the oxygen they need to survive. Rays and skates also breathe dissolved oxygen, but they have gills on their underbellies and holes above their eyes called "spiracles". The water enters through their spiracles and exits through their gills.



Take a look at this exhibit. The top jaw is from an actual shark. Notice how their teeth are sharp and hooked for biting and tearing prey.

See that smaller piece below the shark jaw? Can you guess what it might be?

Believe it or not, those are ray teeth! Notice how flat their teeth are, like our molars. This shape is perfect for crushing and grinding their prey, small invertebrates that live on the ocean floor.

Take your hands and put them into fists. Now rub the flat part of your knuckles together. This is how stingrays chew their food!



Here is what a horn shark (on the left) looks like compared to a leopard shark (right). Horn sharks get their name because they have two horns or barbs sticking out of their “dorsal” (top) fins. This is a defense mechanism that helps protect them from predators.



This sea turtle is named Sapphire. Can you guess what type of sea turtle she is? Her large head should give you a clue!

She is a loggerhead sea turtle.

See the shark in the background? Don't worry, leopard sharks eat small prey and won't hurt Sapphire or these fish.



Sapphire can sometimes look a little strange when she swims, which is part of her story. She was hit by a boat near the state of Florida, which damaged her “carapace”, or top shell. It’s important for boats to go slow and to be on the lookout for turtles.

Take a deep breath in! Sea turtles have lungs and breathe air just like us, and they need to be able to exhale the air in order to dive down to find food. When Sapphire was hit by the boat, it damaged her ability to do this, so now she has small weights attached to her shell to help her dive down in the water. You may see her floating “bottoms up”, but don’t worry, many talented veterinarians were able to nurse Sapphire back to health, and now she has a forever home.



Time to rinse our hands, which is an important step any time you touch an animal. Let’s go outside and take a seat on the benches and take a look at the beautiful view.

Think about what types of animals might live in this habitat.



This habitat is called a wetland. Wetlands are areas of land that are wet part of the time. They can have saltwater, freshwater, or a mix of both.

Remember what we saw in the beginning? The water level was up really high! That was called “high tide”. Now look! There is only a little bit of water here, because it’s “low tide”.



Out this way you can see San Diego Bay. The tides flow in and out from San Diego Bay. The mouth of the Bay connects to the ocean.

Do you think there could be anything bad that the tide brings out to the ocean?

Trash and pollution from our streets get washed into wetlands like this and then swept out to sea.



Throwing away your trash into the correct bins can help save animals. Here, the blue bin is for recycling. Cans, plastic bottles, and glass can go in the blue bin. The black bin is for trash that can’t be recycled normally, like Styrofoam, plastic film, and wrappers. The small bin in the middle is for compost. Remember, compost is a form of recycling that turns leftover food items like banana peels, apple cores, egg shells, and bread crust into healthy soil for plants.



It's time for us to see the birds!

You will learn a lot more about birds in 6th grade with Ocean Connectors, but for now let's go see some awesome bird species.

Which parts of a bird's body give us clues to what they eat? Their beak and feet.



Be really quiet for this first bird. This is a burrowing owl. When they get startled they hide in holes underground.

They can dig their own holes if needed, but usually they steal leftover homes from other burrowing animals, like snakes!

Owls have fixed eyes and extra bones in their neck to turn their heads far and look around. We'll learn more about raptors soon.



Next up is the roadrunner. They get their name because they are not very good at flying and prefer to run on the ground!.

They can reach speeds up to 20 miles per hour. Remember the cartoon with the roadrunner and the coyote? In the wild, a coyote actually can run up to twice as fast as a roadrunner!

Home is a wetland



Light-footed clapper rails live in only 13 coastal wetlands from Santa Barbara, California to San Quintin, Mexico.

They need healthy marshes with tall stands of cordgrass and pickleweed in which to live and breed. They also need crabs, snails, mussels, fishes, insects and seeds to eat.

Clapper rails are considered to be an *indicator species*. If rails can live there the wetland is healthy. If no rails are present the wetland is in trouble.

Read these signs and write down a few notes in your journal.

What are two plants you can find in a wetland?

Saving Clapper rails



Conservation through education
Most people will never see this bird in the wild. Here you can learn about it and then help us save it.

Enhance wild reproduction
We have placed 26 nesting platforms in the surrounding wetlands to aid wild reproduction.

Captive breeding
We are developing captive breeding methods for Clapper rails to supplement wild populations if needed.

Read this sign to find out how Living Coast is helping to save rails, an endangered bird species that lives in wetlands in Southern California and Mexico. This species used to be called the clapper rail but its name has been recently changed to Ridgway's rail.



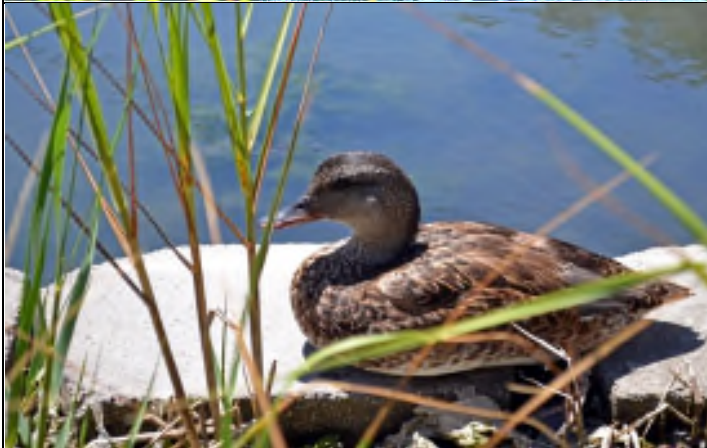
We have just entered the shorebird aviary. Many of the birds here were injured in the wild, rescued, and then brought to Living Coast.

This bird is called a black-crowned night heron, and you can tell by its sharp, spear-like beak that it eats fish.



That beautiful white bird over there is called a snowy egret. The two most common egrets we see in San Diego are the snowy egret and the great egret. The great egret is much bigger than the snowy egret we see here.

The snowy egret has a special adaptation for luring in its prey. They shake their yellow toes to trick fish into thinking they are worms. As the fish swim up – the egret attacks for an instant lunch!



This is a mallard duck. The females are mostly brown and the males have brighter colors like green and blue.

Is this mallard male or female?



This bird is called an oystercatcher. You can tell a lot about what type of food a bird eats by looking at its beak. The oystercatcher uses its long straight beak to pry open shellfish.



Yat-Long Poon

This ruddy duck has a blue beak, which means it must be male. Only the males have blue beaks and their coloration changes with the seasons!

Around summer, they have brownish-red feathers and bright blue beaks (seen here). In winter, their feathers turn gray-brown and their beaks turn gray.



Next, let's see the birds of prey!

Look, there's a bald eagle straight ahead! The bald eagle is a U.S. national symbol and can be seen on some of our currency.

Next to it is a golden eagle, which is a national symbol of Mexico and appears on the Mexican flag.

Golden Eagle
 Águila Real
 (*Aquila chrysaetos*)

WING SPAN: 5.9 - 7.6 ft. wing tip to wing tip

HABITAT: Open habitats, scrublands, grasslands, and mountain regions throughout North America, Africa, and Eurasia

DIET: Small to medium sized mammals, birds, and carrion (dead animals)

HÁBITAT: Zonas abiertas, matorral, praderas y montañas a lo largo de Norteamérica, África, Europa y Asia

DIETA: Mamíferos de tamaño pequeño o mediano, pájaros, y cadáveres de animales muertos

Fun Fact
 The golden eagle is the national symbol of Mexico, found on the flag, currency, and national seal.

El águila real es el símbolo nacional de México, encontrada en su bandera, dinero y sello nacional.

Birds of prey are also called raptors, and they have three things in common. Write this next sentence down in your journal.

All raptors have strong vision, sharp talons, and hooked beaks.



Vision Visión

Raptor vision is up to eight times more powerful than human vision.

- Raptors have more vision cells than humans, allowing them to see more clearly in low-light.
- Some raptors, like the Peregrine Falcon, can see infrared light which helps them find warm air currents needed to climb effortlessly to a hunting altitude.
- A raptor brain receives images from the eye nearly four times faster than a human. This allows them to pinpoint prey from long distances.

Raptor eyes take up more space in the head than human eyes. If our eyes were sized like a Great Horned Owl's, they would be as large as grapefruits!

La visión de las aves de presa es hasta ocho veces más poderosa que la visión humana.

- Las aves de presa tienen más células de visión que los humanos, lo que les permite ver más claramente en poca luz.
- Algunas aves de presa, como el halcón peregrino, pueden ver la luz infrarroja. Esto es muy útil para localizar corrientes cálidas de aire que pueden ser utilizadas para alcanzar sin esfuerzo elevadas alturas.
- El cerebro de un ave de presa recibe imágenes por los ojos cuatro veces más rápido que los humanos. Esto les permite localizar a sus presas a grandes distancias.

Los ojos de las aves de presa ocupan más espacio en la cabeza que los ojos de los humanos. Si nuestros ojos fueran de tamaño proporcional a los de un búho cornudo, ¡tendrían el tamaño de una uva!

Take a look at these signs and write down at least one fact for each.

Raptors have amazing vision. They can see about 8 times better than we can. That would be like standing at one end of a football field, and being able to read a newspaper that is on the other end!

Feet and Talons Patatas y Garras

Raptors use strong toes and sharp talons to attack and hold their prey.

- Birds have special tendons that lock their toes and talons when the ankle is bent. This allows birds to perch and raptors to grasp struggling prey without constant muscle contraction.
- Talons are specialized. The inner and rear talons are the longest and sharpest and are used for grasping and killing. The center-front talon is shorter and is used for scratching and preening.
- Eagle toes have up to a 9-inch span and can exert 200 pounds of pressure per square inch!

Las aves de presa utilizan sus fuertes patas y puntiagudas garras para atacar y sostener a sus presas.

- Las aves tienen tendones especiales que traban los dedos y las garras cuando su pata está flexionada. Esto permite a las aves perchar (o posarse) y a las aves rapaces, sin necesidad de contraer sus músculos constantemente, agarrar a la presa que lucha por zafarse.
- Las garras son muy especializadas. Las garras internas y traseras son más largas y afiladas y se utilizan para apresar y matar. La garras intermedias es más corta y la utilizan para rascarse y acicalarse.
- ¡Los dedos de las águilas tienen una extensión de hasta 9 pulgadas y pueden ejercer una presión de 200 libras por pulgada cuadrada!

¿Puede usted localizar la garra que estas aves utilizan para rascarse y acicalarse?

Can you find the talon used for scratching and preening?

Raptors have sharp, curved talons that allow them to grab their prey off the ground and latch on tight so they don't drop their food as they fly away.

Skull Cráneo

Raptors have strong hooked beaks to rip and tear food.

- Falcons have notched beaks to cut the prey's spinal cord.
- A bony structure called the sclerotic ring supports a bird's large eyeball.

Notice the small space available for the brain in the skull. Birds' brains are mostly devoted to sight and hearing.

Las aves de presa tienen fuertes picos en forma de gancho, capaces de desgarrar y cortar el alimento.

- Los halcones tienen un pico con hendiduras especiales que les ayudan a cortar la espina dorsal de sus presas.
- Una estructura ósea llamada anillo esclerótico da mayor soporte a los grandes globos oculares de estas aves.

Al examinar el cráneo del búho cornudo, tome nota del pequeño espacio disponible para el cerebro del ave. Los cerebros de estas aves están diseñados principalmente para ver y oír.

Raptors have hooked beaks that are great for tearing flesh and eating meat and fish. Their beaks are sharp and good for ripping things apart.

Notice how much of their skull is taken up by the eyes. This is because their eyes are very large and need more room in their skull.



Let's take a look at a few more of the raptors that live here at Living Coast.

This is a red-tailed hawk. Red-tailed hawks are often seen slowly soaring in wide circles high over grassy fields. The red color in their tail is a good way to recognize one in the wild.



Here is the peregrine falcon, the fastest bird in the world. They can reach speeds up to 200 miles per hour! They are tough predators and eat other birds as well as small mammals and rodents.

Falcons are found on every continent except for Antarctica.



What's this? An animal encounter!

These "animal ambassadors" are specially trained to be shown to the public for education about their species.

The American kestrel is the smallest falcon in North America and the second smallest in the world. They are small but fierce predators, hunting prey like mice, lizards, and snakes. Sometimes we see them in the surrounding wetland habitat.



Take a moment to draw a picture of one of the animals you have just seen.

Now let's go inside and see what other animals we can find!



As you walk around the exhibits, read about the species you see and try to write down 10 facts in your journal. You can write one fact for each animal or multiple for a few species of your choice.



These animals are moon jellies. They pulse their "bells" in and out in order to move through ocean currents. They have no eyes or brain, and their bodies are made up of 97% water!



Some of the animals we're seeing today don't live near the ocean, but they are still cool to look at.

This is a blue-tongued skink. Its large, blue tongue is used to scare away predators. It has sharp jaws to help crush insects, beetles, and snails.



This "invertebrate" (which means no backbone) is called a brittle star.

They have 5 long arms to help them move around, and they don't have any tube feet (suction cups) like other sea stars. They can come in many different colors.



These are moray eels, a type of fish. They are shy animals and like to hide in rock crevices. They are nocturnal which means they sleep during the day and are awake at night. Moray eels have a great sense of smell.

Don't confuse them with electric eels; moray eels cannot shock! They are harmless unless something reaches inside their cave.

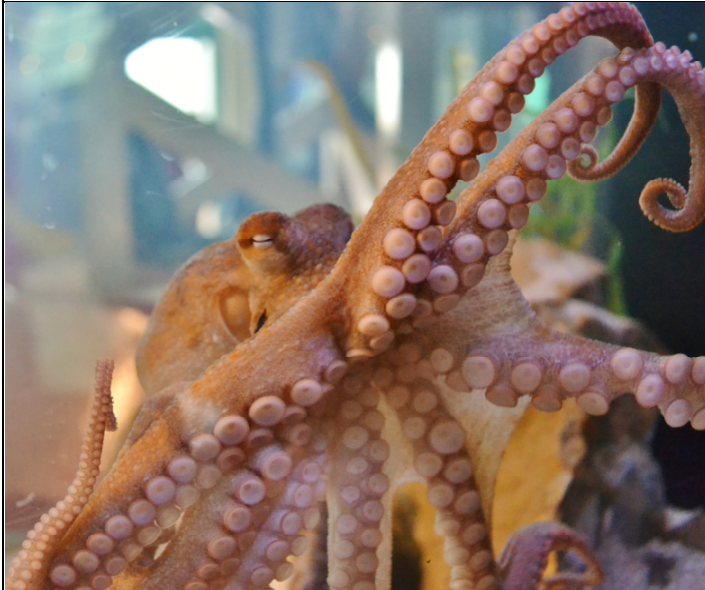
Jonathan Lavan, underpressurephotog.com



This is a desert tortoise. What are the differences between tortoises and sea turtles?

A tortoise lives on land while a sea turtle lives in the ocean. Tortoises can also hide inside their shells while sea turtles cannot. Tortoises have stocky feet and claws to help them dig in the ground, and sea turtles have flippers for swimming.

Did you know a desert tortoise can live a year without drinking water? They get most of their water from the plants they eat.



Here's a two spot octopus. They have an amazing ability to camouflage, with two spots that trick predators. Right now it looks like she's fast asleep.

An octopus has 8 arms with tube feet covering them all! They also have a beak that is located in the middle of all their arms.



We're running out of time for today.

On our way outside to wait for the bus, reach down and touch this fossil from a real gray whale skeleton! It was buried underground for many years.



We can also take one more quick walk out to the Sweetwater Marsh National Wildlife Refuge to see if we can spot any other animals visiting the shores of San Diego Bay.

Sweetwater Marsh was added to the San Diego Bay National Wildlife Refuge Complex in 1996. Endangered wildlife have and continue to call this refuge home.



The many docents, aquarists, and volunteers working at Living Coast take care of all of the animals we saw today! Maybe you can help out here when you get older.

Did you learn a lot today? Write down one more thing that you learned and share it with a friend.



Our partners at Living Coast are essential to helping us provide this field trip for you.

Come back with your family anytime and explore the exhibits again.

Photos taken by Anna Mar unless otherwise credited