

Philippine Coral Reef Educator Guide

Kindergarten - Grade 2

What's Inside:

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- B. EXHIBIT MAP**
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- E. MUSEUM CONNECTIONS**
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Coral reefs are the sparkling jewels of tropical marine habitats.

Welcome to the Philippine Coral Reef Exhibit, which represents one of our planet’s most diverse and fragile marine ecosystems. This exhibit is home to a broad range of aquatic life found in the coral reefs and mangrove lagoons of the Philippine Islands. This includes animals such as delicate soft and hard corals, blacktip reef sharks, stingrays, and more than 2,000 colorful reef fish representing more than 100 species. In this exhibit, students can explore the amazing array of life that exists in the warm, shallow waters off the Philippine coasts.

This exhibit can be seen on two levels. On Level 1, students can walk on a path above a shallow, sandy mangrove lagoon—a calm, protected area inhabited by sharks, rays, and schools of fishes. Where the lagoon drops off to the deep reef, hundreds of brightly colored fishes are visible near the surface, enticing students to view the immersive spectacle one floor below. As you enter the aquarium on the Lower Level, you will see the main Philippine Coral Reef tank. At a depth of 25 feet and holding 212,000 gallons of water, the Philippine Coral Reef tank is one of the deepest exhibits of live corals in the world. Curiosity leads to exploration of several small galleries along the perimeter of the exhibit that highlight the unique adaptations and complex interactions of reef organisms.

The following main themes are found in the Philippine Coral Reef exhibit:

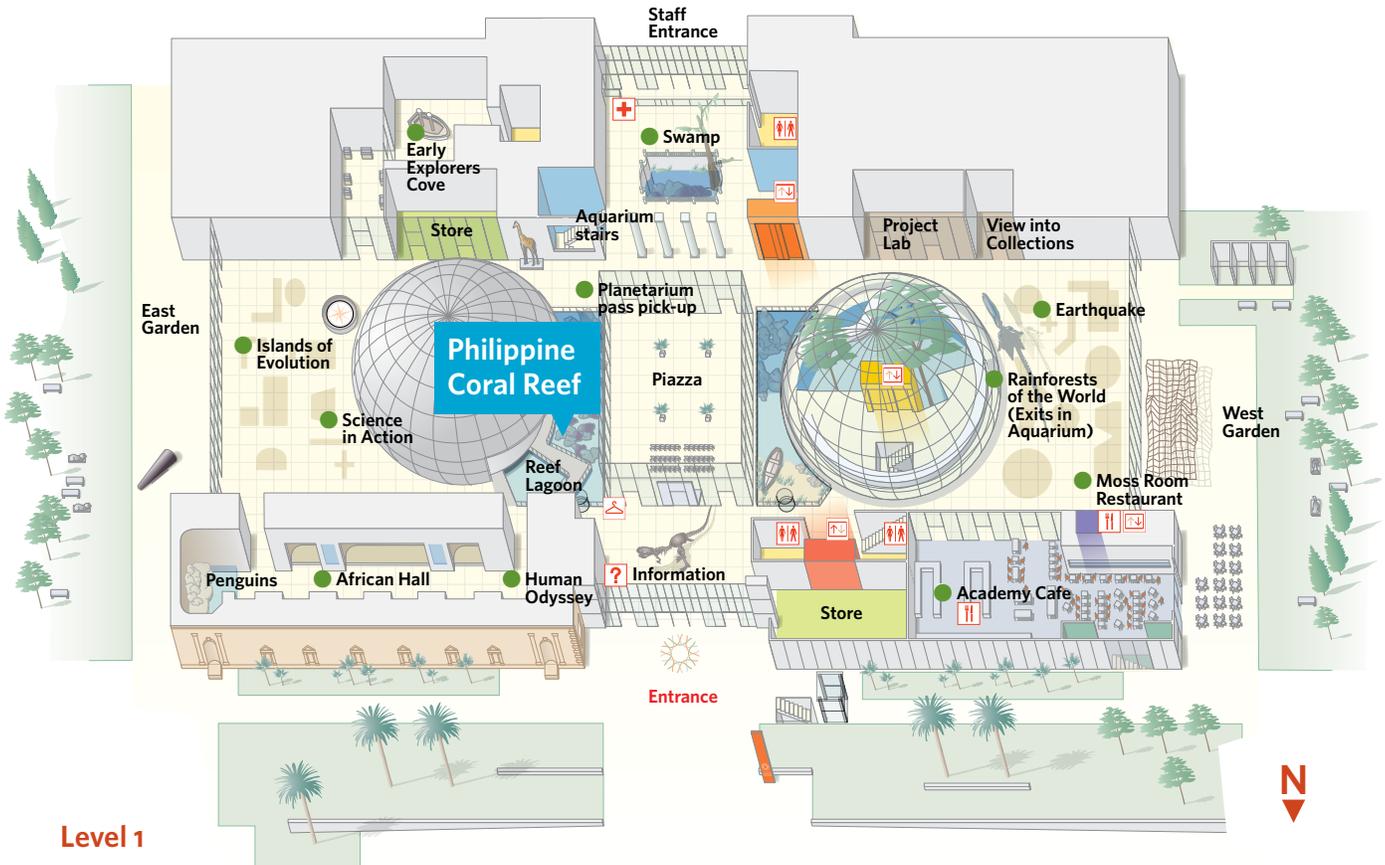
- » Tropical coral reef ecosystems, especially those found in the Philippines, are biodiversity hotspots.
- » Many organisms living in tropical reef ecosystems depend on one another for survival.

Use this guide to:

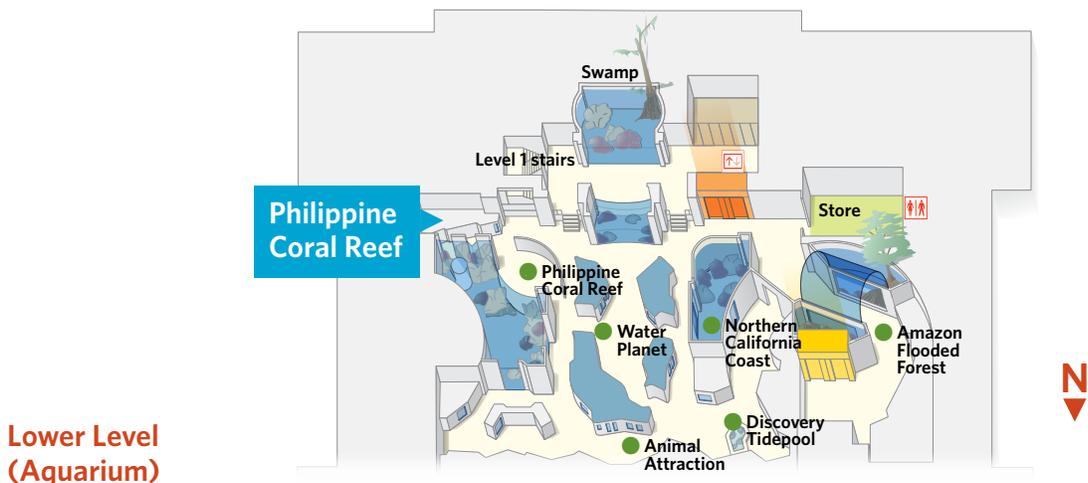
- » Plan your field trip to the California Academy of Sciences’ Philippine Coral Reef exhibit.
- » Learn about exhibit themes, key concepts and behind-the-scenes information to enhance and guide your students’ experience.
- » Link to exhibit-related activities you can download.
- » Connect your field trip to the classroom.



California Academy of Sciences Map

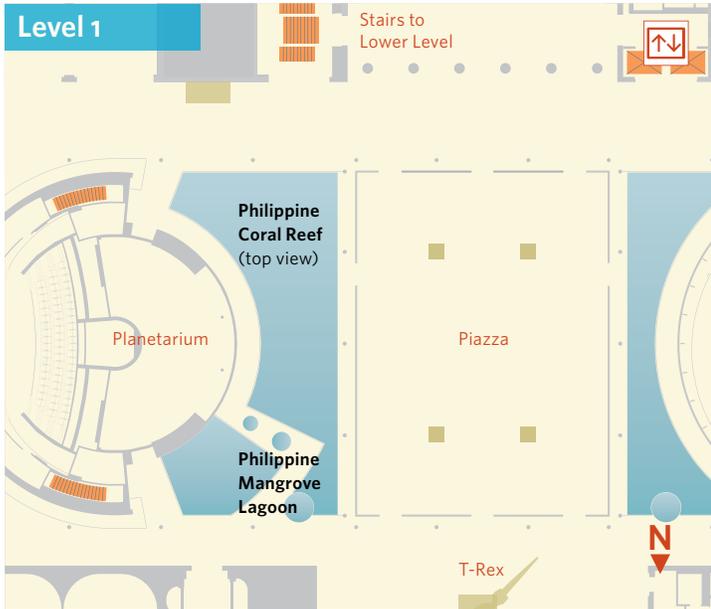


Level 1



Lower Level (Aquarium)

Aquarium Map



Welcome to the Philippine Coral Reef Exhibit, which represents one of our planet's most diverse and fragile marine ecosystems.

Located on Level 1 and Lower Level, the Philippine Coral Reef exhibit focuses on two main themes:

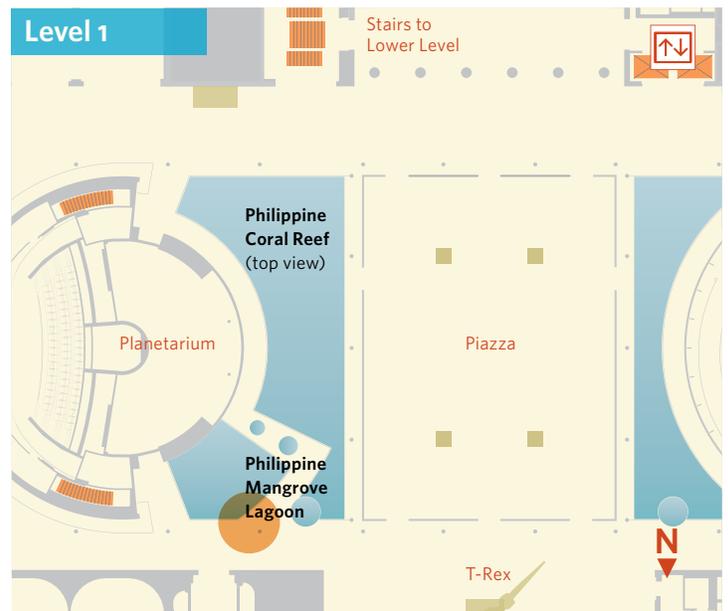
- » Tropical coral reef ecosystems, especially those found in the Philippines, are biodiversity hotspots.
- » Many organisms living in tropical reef ecosystems depend on one another for survival.

Philippine Mangrove Lagoon

Reefs and mangrove lagoons are ecological partners.

Main ideas:

- » Mangroves are types of trees that grow along tropical shorelines.
- » Mangroves are buffers that protect the coast against storms.
- » Young reef animals, such as sharks and fish, find shelter and food among mangrove roots and in lagoon waters.
- » Conserving coral reefs means protecting mangroves, too.



Take a closer look!

Learn about some of the animals found in the lagoon shallows.

Blacktip Reef Shark

Carcharhinus melanopterus

Easy to identify by the black tips on their fins, these sharks are often seen cruising reef shallows in large schools.

Diet: Small fish

Distribution: Indian and Pacific Oceans



Honeycomb Stingray

Himantura uarnak

This ray has a system of sensory organs that run the entire length of its body and tail, called the lateral line.

Its extra long tail can sense approaching predators well in advance.

Diet: Crustaceans and small fish

Distribution: Indian and Pacific Oceans



Photo: J. Charles Delbeek © California Academy of Sciences

Philippine Coral Reef

The more you watch, the more you'll see. At first, a coral reef looks like a moving mosaic. Watch carefully and you'll see order in the mix.

Main ideas:

- » Coral reefs in the Philippines are home to some of the world's richest variety of **marine** life—about 500 coral species and 2,000 fish species.
- » Complex relationships are created as reef organisms compete and cooperate for food, space, and mates.
- » From big fish resting in caverns to tiny shrimp nibbling in crevices, every square centimeter hosts members of the reef community.



Take a closer look!

Learn about some of the remarkable animals found on the reef.

Emperor Angelfish

Pomacanthus imperator

This stunning fish has a blue body with horizontal yellow stripes and a jet black face mask. Juveniles of this species have been observed cleaning parasites off larger fish.

Diet: Sponges and tunicates

Distribution: Indian and Pacific Oceans

Photo: Ron DeCloux © California Academy of Sciences



Carpet Anemone

Stichodactyla spp.

Often mistaken for a plant, carpet anemones are actually animals. Red, green, and blue carpet anemones are an important part of the reef ecosystem and can live up to 100 years. Many larger anemones provide homes for other reef animals including crabs, shrimp, and anemone fish.

Diet: Small drifting animals

Distribution: Indian and Pacific Oceans

Photo: Charles Delbeek © California Academy of Sciences



Color on the Reef

A rainbow of color sparkles on the reef. Have you ever wondered why tropical coral reef residents are some of the most colorful creatures on Earth?

Main ideas:

- » Because coral reefs grow in clear, sunny waters, reef animals use their vision more than those that live in murky waters. Therefore, reef animals use color to communicate in various ways.
- » Color is used to attract mates, fool predators, signal danger, or help animals hide in plain sight.



Take a closer look!

These animals are some of the reef's most colorful residents.

Spotted dragonet

Synchiropus picturatus

Bright colors aren't always for show. The colorful patterns of this fish help it blend in with the reef. See if you can find a greenish fish with blue, orange, and black spots, large eyes and frilly fins.

Diet: Small **invertebrates**

Distribution: Indian Ocean to Western Pacific Ocean

Photo: John E. Randall



Moorish idol

Zanclus cornutus

The color patterns and shape of this fish's body visually breaks up its body outline which may help protect it from predators. This fish has been the iconic symbol of the Steinhart Aquarium since 1923.

Diet: Small invertebrates, **algae**

Distribution: Indian and Pacific Oceans

Photo: Terry Goslinger © California Academy of Sciences



C. KEY CONCEPTS

Caribbean Coral Reef

It's not enough to save a single reef because each one is unique.

Main idea:

- » Scientists study similarities and differences of coral reefs worldwide to understand how to protect them.
- » Tropical coral reefs around the world are threatened by human activities and climate change.



Take a closer look!

Explore some of the animals found only on Caribbean coral reefs.

Queen angelfish

Holacanthus ciliaris

The queen angelfish lives mainly on coral reefs surrounding Caribbean islands. Adults of this species extend their mouth and scrape food from the reef with brush-like teeth.

Diet: Invertebrates & algae

Distribution: Western Atlantic, Gulf of Mexico and Caribbean Sea



Photo: Ron DeCloux © California Academy of Sciences

Cherubfish

Centropyge argi

This is one of the Caribbean's smallest angelfish. It retreats into holes when frightened to avoid predators. Look for a dark blue fish with orange markings.

Diet: Algae

Distribution: Western Atlantic Ocean and the Caribbean Sea



Photo: Ron DeCloux © California Academy of Sciences

Life in the Dark

Some reef species prefer night to day. Learn how reef organisms find their way in the dark.

Main ideas:

- » Even the darkest recesses of the reef are teeming with life.
- » Some reef organisms live exclusively in dark caves, or are active only at night. These animals have special adaptations for life in the dark.
- » Some reef fish have a symbiotic relationship with bacteria. These bacteria produce light that helps the fish communicate, navigate, hunt, and avoid predators.



Take a closer look!

See what's hiding in the dark.

Splitfin flashlight fish

Anomalops katoptron

A chemical reaction in bioluminescent bacteria under this fish's eye produces light similar to fireflies.

Diet: Tiny drifting animals (zooplankton)

Distribution: Western Pacific Ocean

Photo: John E. Randall



Zebra moray

Gymnomuraena zebra

This eel is active at night (nocturnal), and emerges from its crevice or cave to hunt. A keen sense of smell helps it locate prey, and its snakelike body can slip into tight spaces to capture a meal.

Diet: Crabs, clams, sea urchins

Distribution: Indian and Pacific Oceans

Photo: Mark Smith/Photo Researchers, Inc.



Venom on the Reef

Chemical tools aid in reef animals' survival.

Main ideas:

- » Some reef organisms use **venom** and other defensive chemicals to catch prey, defend against predators, and fight infection.
- » The words venom and poison are often used interchangeably, but they actually have very different meanings. Poison is absorbed or ingested, while venom is injected by a specialized structure, such as teeth, spines, or stinging cells.



Take a closer look!

Learn about some of the animals that use chemicals for self-defense.

Fire coral

Millepora spp.

Despite their name and appearance, these marine organisms are not coral at all. Like their close relatives, jellyfish and anemone, fire coral polyps defend the colony by delivering a burning sting.

Diet: Tiny drifting animals (zooplankton)

Distribution: Tropical Oceans

Photo: Ron DeCloux © California Academy of Sciences



Lionfish

Pterois volitans

The flashy lionfish uses its venomous spines for aggression and defense. During courtship, a male lionfish will charge an intruding male with its spines held forward like a charging bull.

Diet: Small fishes, invertebrates

Distribution: Indian and Pacific Oceans; introduced

Photo: Ron DeCloux © California Academy of Sciences



Reef Partnerships

Organisms living in partnership are common on coral reefs—this is called symbiosis. Explore some different types of symbiosis in this exhibit.

Main idea:

- » There are three broad categories of symbiosis: mutualism, parasitism, and commensalism.
- » Mutualism occurs when both partners benefit from the relationship. The foundation of coral reefs is the mutualism between coral polyps and the algae (zooxanthellae) living in their cells.
- » Parasitism occurs when one partner benefits while the other partner is harmed.
- » Commensalism occurs when one partner benefits and the other partner is not affected.



Take a closer look!

These animals are interesting examples of different types of partnerships.

Upside-down jellies

Cassiopea andromeda

Most jellies drift through the ocean on currents, but not this one. It lives upside-down on the sea floor in shallow water of less than 10 meters (33 feet). These jellies have algae living inside their tentacles. Because the jellies are upside-down, the tentacles get plenty of sun exposure so the symbiotic algae can photosynthesize.

Diet: Tiny drifting animals (zooplankton)

Distribution: Western Pacific Ocean

Photo: © W. Gregory Brown / Animals Animals



Pistol shrimp and Shrimp goby

Alpheus spp. and *Amblyeleotris spp.*

The shrimp creates a burrow in the sand that both animals use for protection. If a predator passes by, the goby flicks its tail which alerts the shrimp, and they both retreat into the burrow.

Diet: Tiny drifting animals (zooplankton)

Distribution: Western Pacific Ocean

Photo: Charles Delbeek © California Academy of Sciences



Exhibit Highlights



Photo: © Johan Fredriksson CC BY-SA

Children's Eel Garden

In the wild, a group of garden eels can exceed 1,000 individuals! Garden eels live in sea grass beds on the edges of tropical coral reefs. They stretch their bodies upward and pluck tiny animals (zooplankton) drifting in the current. When threatened, they duck for cover in the sandy bottom.

Garden eels are also homebodies—each rarely leaves its burrow. Their sandy burrows are supported by the eels' hardened skin secretions which prevent cave-ins.

In this exhibit, your students can crawl through a tunnel for an eye-level view of a thriving eel garden.



Voices of the Philippines

Thanks to coral reef advocates, reefs in the Philippines are making a comeback.

Many Filipino communities have successfully embraced the challenge of caring for their reefs. Filipinos rely on reefs for food, income, and protection from storms. Yet their reefs are among the world's most damaged due to pollution, development, unsustainable fishing practices, and other human impacts. Through community education, responsible fishing practices, and establishment of marine protected areas, citizen groups and government agencies are working to help Philippine coral reefs stage a comeback.

In this exhibit, your students can listen to the compelling stories of Filipinos who are working tirelessly to protect their country's coral reefs through stewardship, advocacy, and restoration.

Exhibit Highlights



Photo: © Kevin Twomey

Coral Reef Conservation

Communities that rely on coral reefs are learning that wise actions today mean healthy reefs for future generations. In the Philippines and elsewhere, over-harvesting from reefs results in **habitat** destruction and loss of biodiversity and natural resources.

Think about protecting coral reefs when you shop. Choose fish for home aquaria that were captive bred or collected by hand. When shopping for souvenirs, avoid shells and other trinkets that came from coral reefs. You can also help by preventing trash and pollution from getting into the ocean.

Night and Day, Day and Night

Animals living on a coral reef have a daily rhythm.

As the sun sets on the reef, the animals that are active during the day (diurnal species) hunker down, and a new cast of characters appears. The first to show are the twilight-active (crepuscular) species. The night-active (nocturnal) species follow. These shifts are one way that competition for resources and exposure to predators for reef life are reduced.

The Chambered Nautilus (*Nautilus pompilius*) is an example of an animal with a day and night shift. During the day, the nautilus lives in the dark, cool waters 275 to 610 meters (900 to 2,000 feet) below the surface. This helps it avoid predators. When night falls, it ascends to shallower waters to feed.



Vocabulary

algae	plant-like organisms found in many aquatic (water-based) habitats
camouflage	colors or patterns that help animals blend in with their surroundings, making it harder for predators to see them
habitat	the environment in which a plant, animal, or other organism lives, and that provides the resources the organism needs to survive
invertebrate	an animal that does not have a backbone, such as a sponge or a sea star
marine	associated with the ocean
plankton	plants and animals that drift in the oceans and other bodies of water. Plankton cannot swim or move against water currents, so they tend to drift. Plankton may be microscopic, like fish larvae, or large like some jellies.
venom	a toxin an animal produces to defend itself or hunt its prey; it is delivered by a specialized structure, such as teeth, spines, or stinging cells.
vertebrate	an animal that has a backbone, such as a fish or a snake



Science Behind the Scenes

Caring for the coral reef animals in the Steinhart Aquarium

Have you ever wondered who takes care of the thousands of animals living in the Philippine coral reef exhibit?

It takes a team of expert biologists and engineers working together to recreate a vibrant living Philippine coral reef here at the Academy. Some of the living corals on display were sustainably collected as coral fragments by Steinhart Aquarium biologists in the Philippines. While diving off the coast, biologists removed small pieces of coral from colonies and legally exported them to the California Academy of Sciences. Back at the Academy biologists continued to grow these corals in tanks behind the scenes. This is a process known as propagation. Once corals are large enough, biologists carefully transfer the corals to tanks on the public floor.

“No one person could do it all,” says Bart Shepherd, Director of the Steinhart Aquarium at the California Academy of Sciences. A team of six biologists propagate the corals, feed the animals, clean the tanks, and maintain the careful balance of animals living inside each exhibit.

“My role at the aquarium is to care for a wide range of aquatic animals. Although live corals may look like rather simple animals, they are also one of the hardest to keep thriving. Much of my time is spent behind the scenes ensuring that these animals are living healthy lives,” says aquarium biologist Matt Wandell.



Photo: Will Love © California Academy of Sciences

To help biologists care for the corals, special lights that simulate tropical sunlight makes it possible to grow corals indoors. Inside each coral animal (polyp) live thousands of microscopic algae (zooxanthellae) that share nutrients with their hosts.

One of the main responsibilities of the Aquarium engineers is to ensure that the water in each tank is maintained at the proper temperature and pH level. When oceans absorb the greenhouse gas carbon dioxide, the pH of the water changes, becoming more acidic. This process is known as ocean acidification and poses a serious threat to coral reefs. Exhibits such as the Philippine Coral Reef remind us what healthy reefs should look like.

When asked about his favorite part of his job, aquarium biologist Nick Yim says, “I enjoy feeding the animals, watching the animals grow and the exhibits mature and develop into living art displays.”



Specimen Spotlight

Giant clams

Tridacna spp.

On the first floor, in the shallow pool above the main Philippine Coral Reef tank, you'll find some of the Academy's most colorful residents, giant clams.

The bright colors you see on the clam's body come from tiny algae (zooxanthellae) living inside the clam's tissue, and no two clams have the exact same color pattern. These algae convert sunlight into nutrients that help feed the clam. Clams also use their siphon to draw water into their bodies and filter out tiny drifting plants and animals (plankton). Take a closer look—do you see dark spots along the edges of the clam's colorful body? These are simple eyes that detect changes in light and dark.

Giant clams can grow to a length of 1.2 meters (4 feet), can weigh more than 227 kg (500 pounds), and can live for more than 100 years. Once a giant clam larva settles on a coral reef, it remains in that same spot for the rest of its life! Reef organisms, such as small invertebrates, plants, and sponges, can also be found living on the clam's fluted shell.

There are legends that warn that giant clams can swallow a human whole! There has never been a confirmed report of a giant clam swallowing a human, and we know that the muscle the clam uses to close its shell moves too slowly to take any swimmer by surprise. Most likely, the giant clam would simply hide in its shell rather than attack.



Tridacna gigas



Tridacna crocea



Tridacna crocea



Tridacna maxima



Photo: Bart Shepard © California Academy of Sciences

Because giant clams average only 12 cm (4.7 inches) of growth a year, it takes a long time for them to become giants. The giant clams in our exhibit were produced through aquaculture. Many Filipinos are planting captive-raised giant clams on their coral reefs to restore wild populations.



Related Exhibits

California Coast

Dive into the underwater world of the northern coast of California which contains some of the world's richest temperate marine ecosystems. Compare the animals found in the Philippine Coral Reef to those found along the California coast. At the Discovery Tidepool in the California Coast exhibit, students can get up close and personal with animals of the rocky intertidal zone and learn about the adaptations they have for surviving the changing water conditions of daily high and low tides.

Water Planet

Learn how aquatic animals are specially adapted to survive in their environment as students explore the essential connections between life and water. Learn about a variety of animals that live in and without water. Learn how each animal has unique adaptations for reproducing, moving, feeding, sensing, and defending themselves in their environments. Through interactive stations in the exhibit, students can also explore the different properties of water found on Earth—fresh water, salt water, hot and cold water, surface and subsurface water, frozen, liquid and vapor forms, and how organisms are adapted to each.

Rainforests of the World

Learn about another ecosystem that relies on water in the Rainforests of the World exhibit. Here, the journey through this hot and humid environment begins on the forest floor and takes you up through the different layers of a rainforest. Explore the diversity of plants and animals found in the tropical rainforests of Borneo, Madagascar, Costa Rica and the Flooded Amazon and discover how life there has adapted to the presence of abundant water and seasonal flooding typical of tropical rainforest ecosystems.



Philippine Coral Reef Guide



Foxface rabbitfish
Siganus unimaculatus

Diet: algae, marine plants, corals

Susan Potter © California Academy of Sciences



Pyramid butterflyfish

Hemitaurichthys polylepis

Diet: zooplankton

Ron DeCloux © California Academy of Sciences



Blue-and-yellow fusilier

Caesio teres

Diet: zooplankton

Ron DeCloux © California Academy of Sciences



Palette tang

Paracanthurus hepatus

Diet: algae, zooplankton

Ron DeCloux © California Academy of Sciences



Orange-shoulder surgeonfish

Acanthurus olivaceus

Diet: algae

Ron DeCloux © California Academy of Sciences



Birdnose wrasse

Gomphosus varius

Diet: crustaceans, marine worms, clams, small fishes

Ron DeCloux © California Academy of Sciences



Blue-spine unicornfish

Naso unicornis

Diet: algae, zooplankton

Ron DeCloux © California Academy of Sciences



False clown anemonefish

Amphiprion ocellaris

Diet: zooplankton

J. Charles Delbeek © California Academy of Sciences



Sixbar wrasse

Thalassoma hardwicke

Diet: zooplankton*

Evan Barbour © California Academy of Sciences



Oriental sweetlips

Plectorhinchus vittatus

Diet: crustaceans, sea stars, molluscs

Ron DeCloux © California Academy of Sciences



Emperor angelfish

Pomacanthus imperator

Diet: corals, sponges, algae, tunicates, crustaceans

Ron DeCloux © California Academy of Sciences



Clown tang

Acanthurus lineatus

Diet: algae

J. Charles Delbeek © California Academy of Sciences



Philippine Coral Reef Guide



Lyretail anthias

Pseudanthias squamipinnis

Diet: zooplankton

Ron DeCloux © California Academy of Sciences



Square-spot fairy basslet

Pseudanthias pleurotaenia

Diet: zooplankton

Ron DeCloux © California Academy of Sciences



Lamarck's angelfish

Genicanthus lamarck

Diet: zooplankton

Ron DeCloux © California Academy of Sciences



Double whiptail

Pentapodus emeryii

Diet: brittlestars, marine worms, small fishes, zooplankton

Evan Barbour © California Academy of Sciences



Blacktail damselfish

Dascyllus melanurus

Diet: algae, zooplankton

Ron DeCloux © California Academy of Sciences



Striped cleaner wrasse

Labroides dimidiatus

Diet: scales, mucus and parasites of other fishes

Ron DeCloux © California Academy of Sciences

Corals

Corals such as those pictured below host tiny algae cells inside them called zooxanthellae ("zo-zan-thelly"). In exchange for the protection and nutrients the coral provides, zooxanthellae provide corals sugars and other nutrients. Like plants, zooxanthellae photosynthesize with the help of sunlight.



Green horn coral
Hydnophora species

Evan Barbour © California Academy of Sciences



Leather coral
Sarcophyton species

Ron DeCloux © California Academy of Sciences



Staghorn coral
Acropora species

Bart Shepherd © California Academy of Sciences



Plate coral
Montipora capricornis

Evan Barbour © California Academy of Sciences



Brain coral
Leptoria species

Evan Barbour © California Academy of Sciences



Moon coral
Acanthastrea species

Ron DeCloux © California Academy of Sciences

Suggested Activities to Download

Download these activities from our website to enrich your field trip experience.

» **Pre-Visit Activity:** Fish Forms (suggested grades K-2)

www.calacademy.org/teachers/resources/lessons/fish-forms/

In this lesson, students will learn the characteristics of fish and create a three-dimensional sculpture.

» **At-Academy Activity:** Is That a Fish? (suggested grades K-2)

www.calacademy.org/teachers/resources/lessons/is-that-a-fish/

This activity is a ready-made worksheet, scavenger hunt, or sketching exercise that complements one of our exhibit halls. Just download, print, and make copies for your students! Don't forget to set the stage for the activity, and clarify any rules.

» **At-Academy Activity:** Let's Catch Fish! (suggested grades K-1)

www.calacademy.org/teachers/resources/lessons/lets-catch-fish/

Through this scavenger hunt, students will learn that looking at shape is a good way to identify fish, and learn that fish have body parts that help them thrive where they live.

» **Post-Visit Activity:** Coral Reef Habitat Match (suggested grades K-2)

www.calacademy.org/teachers/resources/lessons/coral-reef-habitat-match/

In this activity, students will learn that different marine animals inhabit different environments and discuss characteristics of animals that help them survive in their environment.

» **Anytime Lesson Plan:** Coral Polyp Party (suggested grades K-2)

www.calacademy.org/teachers/resources/lessons/coral-polyp-party/

In this lesson, students will learn the anatomy of a coral polyp, and review a few of the differences between plants and animals.

Be sure to review our teacher resources online!

www.calacademy.org/teachers/resources

» **Pre-, during-, and post visit activities:** short, lively activities to focus your class trip to the Academy.

» **Connected experiences:** Activity combinations that extend the museum visit into the classroom.

» **Anytime lesson plans:** Full-period lessons to integrate into your yearly curriculum.

CA Science Content Standards

Kindergarten

Life Sciences

2a: Plants and animals: comparing

Grade One

Life Sciences

2b. Plants and animals: needs
2c. Plants and animals: need each other

Grade Two

Life Sciences

2c. Organism characteristics
2d. Variation



Guiding Questions and Answers

Use these questions to get students thinking about the Philippine Coral Reef.

» **Observe the Philippine Coral Reef tank.**

What do you notice about where animals are found? Why might animals be found in different places on a coral reef?

Different animals live in different areas of the coral reef. Some animals live on the sandy floor, others near the surface. Some animals live in the crevasses of rocks while others move around the whole tank. By living in different areas of the reef, animals can eat different things and survive in different ways without competing for resources.

» **Corals come in all shapes and sizes. Do these corals look like anything you recognize?**

Some corals look like brains, other corals look like carpets, trees, or bubbles. Each type of coral is uniquely suited for its life on the reef. While these shapes might not remind you of animals, corals are groups of tiny animals (polyps) living together to form a colony. Their skeletons are made of calcium carbonate which builds coral reefs. Corals are actually related to jellies. Regardless of the shape, many tropical corals have tiny algae living inside their tissue which help to provide food for the coral through photosynthesis.

» **What colors do you see in the Philippine Coral Reef exhibit? How many colors do you count? Do you notice any patterns?**

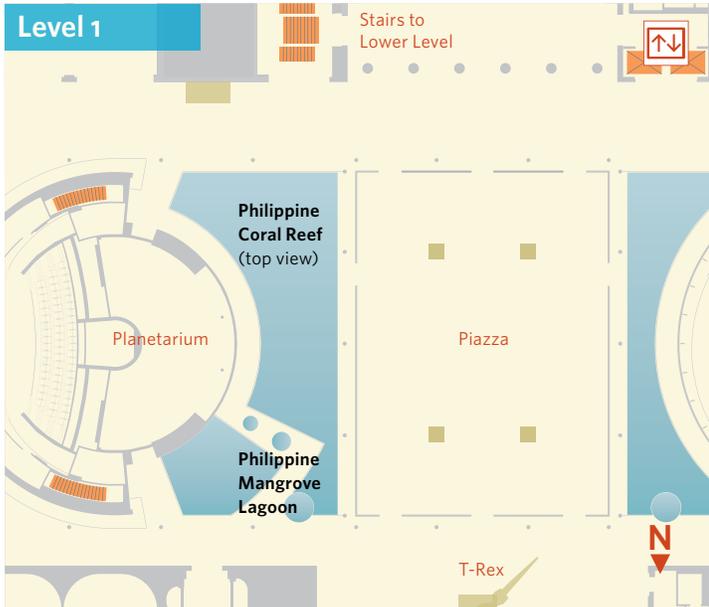
Coral reef fish are often brightly colored because the water they live in is crystal clear, so they can see each other very well. Bright colors allow fish to communicate in different ways, to attract a mate, or hide from predators. Coral reefs are often called the “sparkling jewels” of the sea because the reef and its inhabitants are so colorful. You might spot a pattern on the body of a single fish, or notice the pattern of a school of fish as they move around the tank.

» **What parts make up a fish body? How is your body similar to the body of a fish? How is your body different from the body of a fish?**

Humans have arms and legs to help them move around on land. Fish have fins that help them move through the water. Both humans and fish use their five senses to navigate in their environment, but they use their senses in slightly different ways. For instance, humans use their ears to listen for sounds. Fish use a special organ, known as the lateral line, to “listen” for sound vibrations in water. Fish also use their noses for smelling in water rather than breathing. In fact, a fish can smell food from great distances!



Aquarium Map



The Philippine Coral Reef Exhibit represents one of our planet's most diverse and fragile marine ecosystems.

Located on Level 1 and Lower Level, the Philippine Coral Reef exhibit focuses on two main themes:

- » Tropical coral reef ecosystems, especially those found in the Philippines, are biodiversity hotspots.
- » Many organisms living in tropical reef ecosystems depend on one another for survival.