# EXPLORING NATURE AND SCIENCE AROUND THE WORLD

inside... all about coral 😭 helpful hawksbill sea turtles 🕸 harmful starfish

ON THE



### Dear Readers,

Are you ready to become a reef expert? Dive right in!

In this issue we'll learn about a few of the animals that call coral reefs home. From the big, to the small, to the weird, this magazine will explore the reef. We'll learn about what exactly corals are and what makes them so important to our ocean friends, but also to those of us on land. Get ready to meet a flippered hero to the reefs, and also learn about what's damaging them. We'll set some things straight about a misleading name or two, and answer questions you may not have even known you had. If you still have questions turn to page 15 to write us a letter, and ask us anything you want.

Best Fishes,

### The Cousteau Society

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SOLUTION TO MAZE ON PAGE 20



#### WHAT ARE CORAL REEFS? Coral reefs may look like a

bunch of colorful rocks, but they're so much more! They may not seem like it, but corals are animals just like people, fish, and whales. Coral is made up of a bunch of different polyps. These tiny animals form colonies and all together make up a coral. **Some** corals are hard and some are soft, but both are made up of

polyps. The hard ones are made from polyps that create a skeleton out of calcium carbonate. This skeleton protects the polyps and creates a surface for new polyps to attach themselves. When a lot of corals grow near each other then they make a reef. Corals grow very slowly so it takes a long, long time for reefs to build up. Most coral reefs today are less than 10,000 years old, but coral reefs have been around for hundreds of millions of years!

Coral reefs are so colorful and full of life, they are often called

CONTRE 202

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THE RAINFORESTS OF THE OCEAN

## WHERE DO CORAL REEFS GROW?

Most coral reefs are located around the equator where it's warm all year. They tend to grow relatively close to coastlines and around islands. Coral reefs are the world's biggest single structure made of living organisms. The largest coral reef is the Great Barrier Reef off the coast of Australia. The Great Barrier Reef is so massive that it can be seen from space!

You'll find most coral reefs in shallow, warm water, preferably in a place with lots of waves. The waves bring in oxygen and food that the corals need, and also prevent too much debris from settling on them.

Corals may be animals, not plants, but they still need the sun to survive. Why? Because coral needs algae, and algae needs the sun. The algae live on the coral and provide food and oxygen to the coral with energy that they get from the sun. The coral gives the algae a place to live and carbon dioxide for respiration. It's a partnership!

**COUSTEAU KIDS** 

## WHY ARE CORAL REEFS IMPORTANT?

We could fill a book with reasons why coral reefs are important. There are so many!

Coral reefs are home to tons of different animals, and are some of the most biologically diverse ecosystems on the planet. This means that coral reefs provide a habitat for a huge variety of living things. Diversity is important because it increases the chances of life continuing in the event of a disaster that destroys many different species. Areas with a lot of biodiversity are the healthiest and most stable. Coral reefs provide shelter and food for animals whether they live there full time or just pass through. Reefs provide essential sites for feeding, mating, and laying eggs. They are also nurseries for baby animals to grow up. Lots of reef dwellers work together as a team to find food and avoid predators. Countless animals call them their home, so life on the reef must be pretty good!

Coral reefs are so important that even people rely on them. Reefs protect coastlines from erosion and provide a buffer from storms. They generate tons of money in tourism, and may even provide medicines for treating diseases. Scientists guess that up to 1 billion people count on food taken from reefs each year. You don't have to live in the ocean to see the value in protecting these amazing places!

CORAL REEFS TAKE UP LESS THAN 1% OF THE OCEAN FLOOR, BUT NEARLY 25% OF LIFE IN THE OCEAN LIVES IN THEM. CHRISTMAS

You won't find these festive worms anywhere near the North Pole.

Christmas tree worms like to live in warm, shallow water, making coral reefs a perfect place for them to call home. The feathery limbs, known as crowns, give these worms their name. Crowns have many uses. In addition to looking fabulous, the crowns help with breathing and feeding. Each Christmas tree worm has two crowns and they come in many different colors. The worms eat by pumping water through the crown and filtering tiny plants and animals out. The crowns also take oxygen from the water, which allows the worms to breathe. Funky looking and functional!

The crowns may be the coolest looking part of the Christmas tree worm, but they're not the only part. Two-thirds of the worm is hidden in a tube within the coral. When a worm finds the perfect place to settle down it will burrow into the coral to create its new home. Christmas tree worms are easily startled and will retreat into their tubes when something moves near them. If they pick a good home, then the worm can live up to 40 years. What better place to spend that time than living in a beautiful coral reef!

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## BLACKTIP REEF SHARK

This shark's handy name tells you most of what you'd need to know to identify it. If you're ever swimming in the ocean and see a shark:

Is it hanging out in a reef?

Do its fins have black tips?

You've probably got yourself a blacktip reef shark!

All of the little fish that like to live in coral reefs attract some much bigger ones, including the blacktip reef shark. The blacktip reef shark looks like a typical mid-sized shark, with a streamlined shape and a blunt snout. These sharks may look ordinary, but they possess a special talent that very few other fish have. Blacktip reef sharks are known for jumping completely out of the water and into the air. They have also been seen sticking their faces out of the water to look around. This behavior is called spy hopping, and is something that orcas are known for.

These sharks often swim in water shallow enough that their black tipped top fin sticks out of the water. This may be the classic sign of trouble in movies, but in reality these sharks tend to be pretty shy and won't usually bother people or other large animals. Blacktip reef sharks may be timid but they get along well with each other, and are often seen swimming around in large groups. Scientists think that they like to stick together for safety. They may even choose who they want to hang out with and who to stay away from. They have their own shark buddies!

A lot of sharks migrate just like geese and salmon. They will travel to other waters with the changing seasons to breed or follow their food sources. Since blacktip reef sharks live in tropical waters they don't need to worry about getting too cold or running out of food. A lot of blacktip reef sharks will spend their whole lives in the reef where they were born. If you lived in a coral reef you'd probably never want to leave either!

## SHARK **STATS**





HOME RANGE

MAX LENGTH

MAX WEIGHT



#### Are starfish actually fish?

Nope! Even though starfish have fish in their name, they are actually echinoderms (ih-kahynuh-durms), not fish. They are much more closely related to sand dollars, sea cucumbers, and sea urchins. In fact, some people refer to them as sea stars to avoid this confusion.

#### Do corals need to eat?

We know that corals are animals not plants, so it's no surprise that they need to eat just like other animals. The tiny polyps that make up a coral can catch even tinier animals with their tentacles. The tentacles bring the food to the polyps stomach for digestion. Also, the algae that live within the polyps get energy from the sun, which transfers to the coral.

## What other kinds of animals live in coral reefs?

You can find seahorses, lobsters, clams, eels, shrimp, crabs, jellyfish, sea anemones, lots of different fish, and so much more all sharing a coral reef. Thousands of species rely on reefs, with scientists guessing that there are thousands more that haven't been discovered yet.



#### Can sea turtles breathe

#### underwater?

Sea turtles may live in the oceans like fish but they're actually considered reptiles, and just like reptiles on land sea turtles need to breathe air. They have lungs like land animals and not gills like fish. When they are swimming sea turtles need to surface to breathe every few minutes, but if they are relaxed then they can hold their breath for much longer.







### This sea turtle is a true friend to coral reefs

The hawksbill sea turtle gets its name from the pointed shape of its mouth which resembles that of, you guessed it, a hawk. Despite the name, hawksbill sea turtles are no more closely related to birds than any other type of turtle. The turtle's beak doesn't have any teeth, but it is very sharp and perfectly suited for tearing up food. Their extra sharp beaks are specially designed for getting at sea sponges that live in the crevices of coral reefs. This may be bad news for the sponges, but the coral would definitely thank them.

Sea sponges - not to be confused with the kitchen variety - are important members of reefs. In a healthy reef, there's a balance between everything living there. Space is competitive on the reef and when the balance is upset, sponges tend to take over. This leaves less room for coral to grow, decreasing the diversity of life and therefore, the health of the reef. Not many animals can eat sponges so the hawksbill sea turtle is even more important for its sponge snacking capabilities. Other animals also benefit from hawksbill sea turtles eating sponges. When they rip up the sponges with their sharp beaks, this releases tiny bits of sponge into the water. The animals who couldn't tear the sponges up themselves can now eat them. This makes the hawksbill sea turtle a champion of the reef!







ONE SEA TURTLE CAN EAT OVER 1,000 POUNDS OF SPONCES PER YEAR









SEA TURTLES CAN LIVE TO BE OVER 100 YEARS OLD



CROWNOF THORNS STARFISH COUSTEAU KIDS

This spiky starfish may look like a part of the reefs that it calls home, but don't be fooled, they are actually eating the corals for lunch!

Crown of thorns starfish (let's call them COTS for short) are large, prickly starfish that make meals out of hard corals. The COTS can be found all over the world, in the same places where reefs live. They look similar to other starfish, with a flat body and arms sticking out from the center, but they have a few special features. One is super obvious - those spikes! The spines that give the COTS their name are not only sharp, they're also venomous. They do a pretty good job of keeping other predators away - not many animals want a mouth full of spikes or a nasty sting. You should never get too close to any wild animal, and this is especially true with these starfish.

COTS play an important role in keeping coral reefs healthy, and giving lots of different kinds of coral room to grow. COTS prefer to munch on the faster growing species of coral, which gives the slower spreading species time to develop. Without the COTS making room for the slow growing corals, reefs would only have room for the fast growing ones, and there would be fewer species of coral. How does something that can't chew eat something as hard as coral? Get ready for a gross-out: the COTS will extend its stomach out of its mouth and cover the coral. The stomach releases digestive juices that break down the coral, and the COTS soaks up the nutrients from the remains.

Like everything in life, there needs to be a balance on the reef. In recent years the COTS population has exploded, and they are eating corals faster than they can grow back. It takes a long time, but reefs can recover from being snacked on by COTS. However the reefs are facing a double whammy, being hit by COTS and other stresses like coral bleaching.

Unfortunately COTS aren't the only threat to coral reefs. Turn the page to find out more about the danger that coral reefs are in. . .



A SINGLE CROWN OF THORNS STARFISH CAN EAT UP TO 65SQ FT OF CORAL IN ONE YEAR!

#### THIS CORAL REEF IN INDONESIA WAS DESTROYED BY A TSUNAMI AND HASN'T STARTED TO REGROW YET!

CORAL REEFS ARE IN DANGER AND THAT MEANS THAT SO IS EVERYTHING THAT RELIES ON THEM We've talked about balance and teamwork a lot in this issue. When everything is in balance the environment is healthy and so is everything living in it. This makes it easier to bounce back when something goes wrong like a natural disaster, disease, or temperature change. Harmony is important in everything, and reefs are a terrific example of this. Corals grow very slowly so when they are damaged it takes a long time for them to get healthy again. Currently corals are being damaged faster than they can repair themselves. Sadly, it's people who are causing most of the damage. Luckily this means that it's people who can reverse the damage. Pollution hurts the reefs as well as the other living things who depend on its survival. Overfishing removes too many vital species, and vacationers enjoying the reefs can easily harm them.

You may have heard about coral bleaching, but do you know what that means? Remember the algae we talked about that lives on corals? Turn back to page 4 if you need a refresher. When the water temperature gets too hot or too cold, or if the waters become polluted, then the coral will expel the algae living on them. This causes the coral to lose their bright colors and turn white. It also makes them much more likely to get sick. Luckily this doesn't mean that the coral is dead right away. If water conditions return to normal quickly then the coral can recover. People all over the world recognize the importance of coral reefs. They are working together to prevent any more bleaching events and to reduce other coral stressors. There are even artificial reefs being made from things like sunken boats to provide a place for corals to grow and habitats for reef animals. Things may look grim, but if everyone chips in we can save our ocean's precious coral reefs!



## WHAT CAN YOU DO TO HELP **KEEP CORAL REEFS HEALTHY?**

We just learned a few things that scientists are doing to help reefs, but there are also actions you can take. Even if you live far away from a coral reef there are still simple things that you can do to help protect them. No matter how far we are from the ocean our actions can still affect it.

I. Ask your parents to buy cleaners and other chemicals that are biodegradable. This means that it can be broken down naturally and won't pollute the water if it ends up in the ocean.

2. Use less water. The less water we use the less wastewater ends up polluting our oceans.

). Keep waterways clean. Be sure not to litter anywhere, since trash can end up in the ocean and hurt marine life.

#### 4. Be a smart traveler.

Encourage your family to walk or bike when possible. Emissions from cars contribute to climate change which hurts reefs.

5. Never buy souvenirs made from corals or other sea creatures. Corals, dried sea horses, shark teeth, sea turtles shells, and many other animal parts are gathered in destructive ways. By not buying them sellers will stop collecting them and the animals will stay in the ocean where they belong.

0. Share the message. As always, teach your family and friends what you've learned and encourage them to join you in saving our coral reefs!

Sincerely,

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