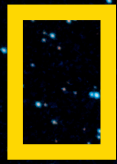


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**NATIONAL
GEOGRAPHIC**



Explorer

TRAILBLAZER

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a Better Place! 10**

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What the



Will the Tasmanian devil
win its fight against
a mysterious disease?

By Brenna Maloney

Devil!

Wildlife and Wild Places

LIFE SCIENCE

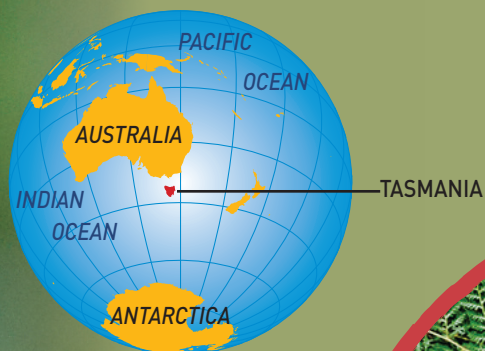
As you read, think about what characteristics Tasmanian devils have that help them survive.



The sound is hard to describe.

It can be like a harsh cough. Or an angry hiccup. Or a sharp shriek. It all depends on what is being said and who is doing the talking. When a Tasmanian devil “speaks,” it’s best to listen.

Tasmanian devils are found in only one part of the world, on the island of Tasmania. It’s off Australia’s southeastern coast. Devils were once on their way to extinction, victims of a strange cancer. Today, they are making a recovery. How? Find out!



To start, Tasmanian devils are **marsupials**. That's a kind of mammal like the kangaroo. The young finish developing in their mother's pouch. The pouch helps her feed and protect her newborns, called imps. A mother can give birth to as many as 40 imps. Yet, there is only space for four in her pouch. Only four can survive.

Newborn imps are the size of raisins. They stay in their mother's pouch for four months. After six months, they are ready to eat solid foods. Tasmanian devils are **scavengers**. They eat dead animals, called **carrion**. They will eat dead wallabies, opossums, and wombats.

Tasmanian devils eat dead animals.

Tasmanian devils are not picky eaters. They will also eat birds, lizards, frogs, and even dead farm animals.

Strong necks hold up their skulls. Their skulls are large to support their strong jaws. Devils eat their prey with its bones, fur, and all. Their teeth are built for biting, tearing, and crushing.



actual size
at birth



From Imp to Devil

At birth: Each imp is the size of a raisin. Four imps crawl to their mother's pouch.

4 months: The imps are old enough to leave their mother's pouch. They often ride on her back.

6 months: The imps stop drinking milk. They begin eating solid food.

8 months: The young devils leave their mother. They live on their own.

2 years: The devils are old enough to have their own young.

Adult life: Wild devils can live up to eight years.

All About Tasmanian Devils

ears: nearly hairless; ears increase sound; thin skin causes ears to look red when devils are excited or stressed



eyes: see in black and white, which is useful for detecting movement of prey

whiskers: appear in clumps on top of the eyes and mouth; help devils feel for food in the dark

teeth: 42 large, sharp teeth; molars can crush bone and tear skin; canines often stick out of the mouth when it is closed

claws: used for digging dens and climbing trees

pouch: is a safe space for newborns to grow



skull: large skull to support dense jaws



front legs: longer than back legs, which causes a sprinting step

fur: dark brown or black, often with a white stripe across the chest; lighter markings on the shoulders and rump



tail: long and thick at the base; stores fat for times when food is scarce

When it hunts at night, a Tasmanian devil might travel 16 kilometers (10 miles).



In the Wild

Devils are **nocturnal** and usually solitary. But that changes when food is around. Devils have an excellent sense of smell. They can smell carrion from 0.8 kilometers (about half a mile) away. Once they smell it, they can track it fast.

Devils quickly create an order about who eats what—and when. They “growl-whine.” They “screech.” They “shriek.” Each sound means a different thing. A “discussion” about a dead wombat might begin with snorts and end with shrieks. Say, a number of devils all want to eat. They combine their sounds with biting. They use their jaws to snap at each other. And that’s where trouble began.

These Tasmanian devils “talk” over dinner.

Trouble in Tasmania

In 1996, a photographer took a picture of some devils on the island. There were large growths on their faces. He had never seen anything like it. He shared it with some scientists he knew. By 2002, scientists learned it was a rare type of cancer. This cancer can spread from one animal to another. It is called devil facial tumor disease. And it is fatal. Say one devil has it and bites another. Both will be sick with the cancer.

Scientists know that devils often bite each other fighting for food. This caused the disease to spread quickly.

Captive breeding programs made sure disease-free devils would live on.



This devil is released from a trap that helps scientists watch over its health.

Why didn't a devil's body fight the cancer cells? It turns out that this type of cancer can "hide." The devil's body thinks the cancer is part of its body. So, its body doesn't fight back. The cancer continues to grow. It may grow so large that the devil cannot eat. Then the devil will starve.

Devils were dying in great numbers. Scientists feared the devil would die out. But, that's not what happened.

Progress With Protection

Wildlife officers removed healthy devils from the wild. They began a captive breeding program. Now, a healthy population would thrive.

Another step was to set up safe traps for catch and release to record the devils' health. In the lab, scientists studied the disease. Could they find medicine to protect devils? Some devils are regaining their health. Their bodies may be adapting to fight the disease. Scientists are hopeful. The recovery of Tasmanian devils is important!

WORDWISE

carrion: a dead animal that a scavenger eats

marsupial: a mammal (an animal that has fur or hair and feeds its babies milk) whose young finish developing in a pouch on their mother's abdomen

nocturnal: active at night

scavenger: an animal that feeds on dead animals



Make the World a Better Place



World Face!

The Human Journey

INFORMATIONAL TEXT

As you read, identify the main idea and think about how the author supports it with details.

Creating positive change comes in all shapes and sizes. Wherever and whoever you are, the world needs you. We are all here to help. But you must lead!

By Lisa M. Gerry





Think Globally

It's important to know about places in the world. Why? To make the world a better place. Do you know where other cities, countries, and continents are? This will help you make sense of the stories you read and news you hear.

When you hear about a new place, find it on a map. See where it is. What big cities are nearby? What languages do people speak? What is life like there from day to day?



Listen

Every person has a story. It might be about their past. It could be about their hopes for their future. When people share their story, they are telling you who they are.

Being a good listener means being curious about others. It means caring about their feelings. That can make you more compassionate, which can help make the world a better place.





FIVE WAYS TO BOOST YOUR LISTENING SKILLS:

- 1. TRY TO UNDERSTAND.** Don't worry about having an answer at hand. Instead, try to figure out what the person is trying to say.
- 2. FOCUS.** That means putting away all distractions. Give whoever's talking your full attention.
- 3. DON'T INTERRUPT.** Give the speaker the space and time to express themselves the way they want to.
- 4. BE OPEN-MINDED.** When someone tells you something personal, they're trusting you with their feelings. They're giving you a little peek into their heart and their mind. Be respectful of that. Don't judge.
- 5. LET THEM KNOW THAT YOU UNDERSTAND.** (Or that maybe you don't.) When you want to let someone know they are being heard, say, "It sounds like what you are saying is...." Or, "Do you mean...?"

Think About Things Critically

Be a critical thinker. Think about facts and evidence. What happens when info is not fact-checked? Then you have to find a source you can trust.

How do you know whether or not to trust a source? Consider these questions:

- 1. Who is the information coming from? Who is the original source?**
- 2. Is this source trustworthy? Why or why not?**
- 3. Does this source have a reason for sharing this information?**
- 4. What does this source get from my belief in this information?**
- 5. Do other trustworthy sources confirm or agree with this information?**



TRUTH



Join a Team

So, you want to change the world. Chances are you can't do it alone. Try joining a team. You'll make new friends and feel part of the group. You'll learn how to share with others. And you'll be there for others when they need it. Best of all, you will learn to get along with people you might not always hang out with.

There are many sports teams you could try out. There are also dance teams, newspapers, choirs, and many other clubs.

Stand Up for Justice

Have you ever gotten into trouble for something you didn't do? Well, that isn't fair! But injustice happens every day, in small ways and big ways.

It takes courage to speak up when you see injustice. You see someone being picked on. What do you do? Find a safe way to say or do something. That might mean speaking to a teacher, coach, or parent. Or it might mean saying to the person, "I'm sorry that happened."

STOP



Ask Questions

Think of yourself as an investigator. You want to figure out how stuff works. Or, why things are the way they are. Ask all the questions you have until you find the answers you're looking for.

Walk the Talk

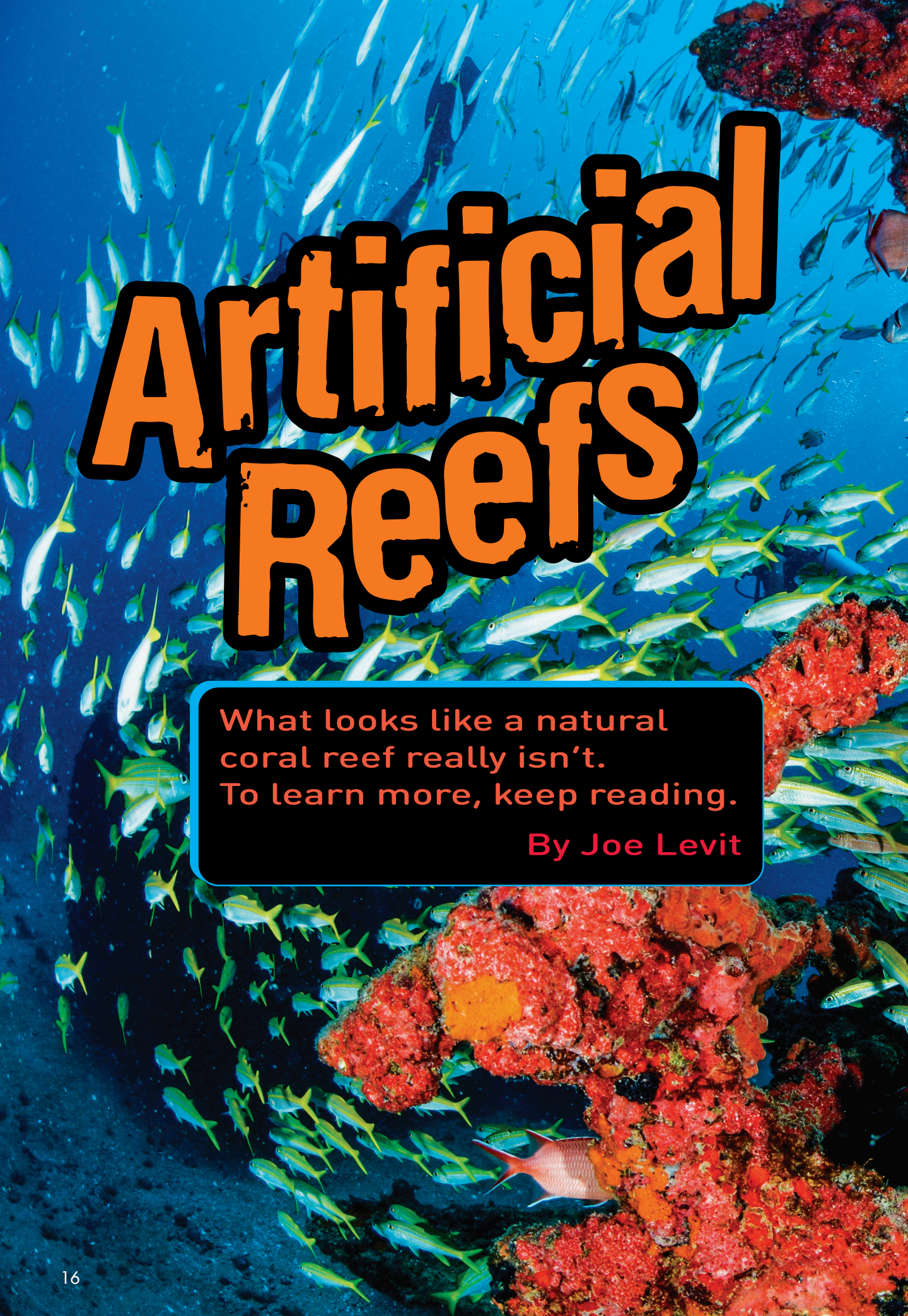
Have you ever been kind to someone's face? But then you talk about them behind their back. Don't say one thing and do another!

Want more suggestions on how to change the world? Read "100 Ways to Make the World Better!" by Lisa M. Gerry

"Be the change that you wish to see in the world."

**—Mahatma Gandhi,
social activist**





Artificial Reefs

What looks like a natural
coral reef really isn't.
To learn more, keep reading.

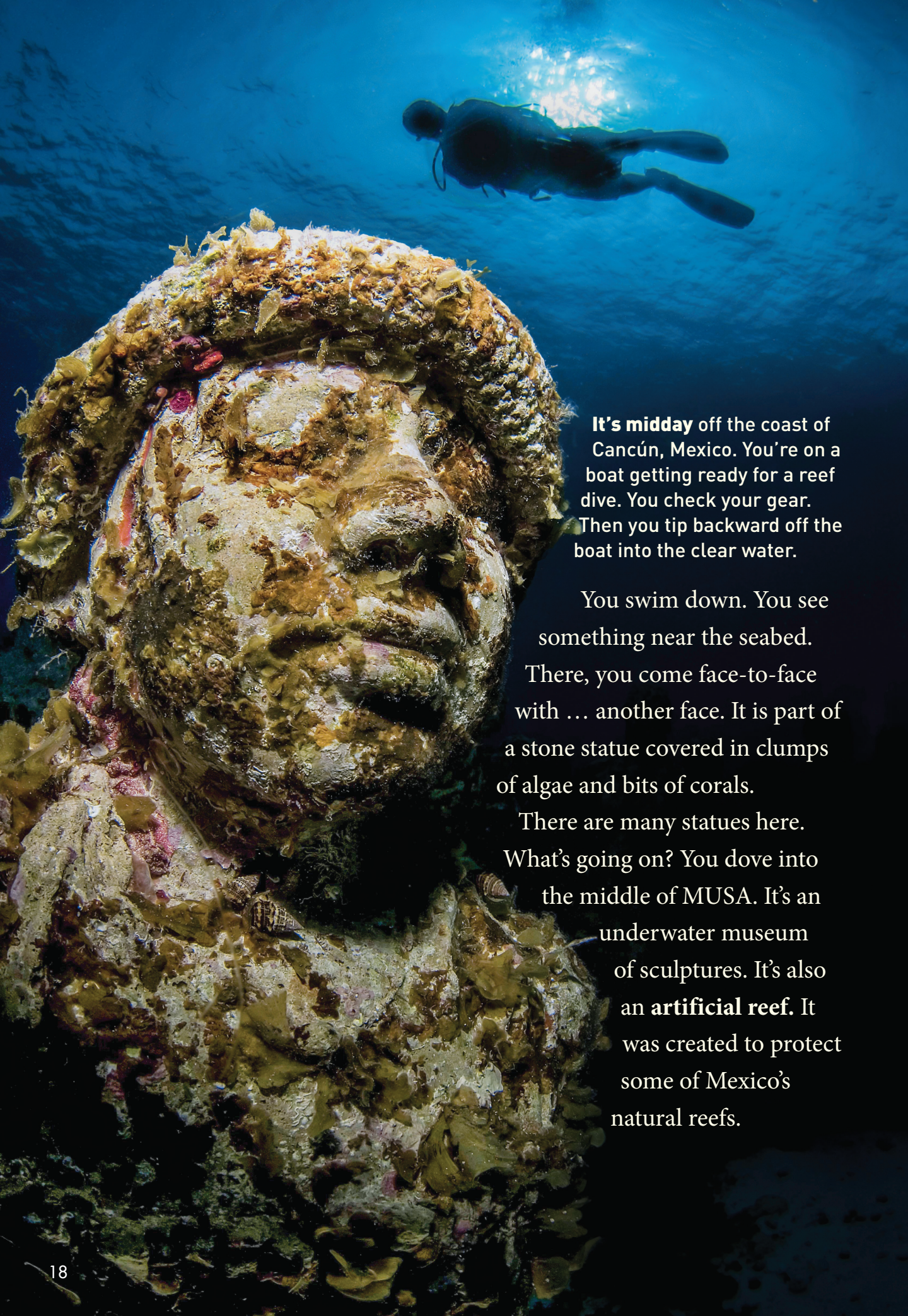
By Joe Levit

Wildlife and Wild Places

LIFE SCIENCE

As you read, think about how people are changing a habitat by providing artificial reefs and how that change affects living things.





It's midday off the coast of Cancún, Mexico. You're on a boat getting ready for a reef dive. You check your gear. Then you tip backward off the boat into the clear water.

You swim down. You see something near the seabed. There, you come face-to-face with ... another face. It is part of a stone statue covered in clumps of algae and bits of corals.

There are many statues here. What's going on? You dove into the middle of MUSA. It's an underwater museum of sculptures. It's also an **artificial reef**. It was created to protect some of Mexico's natural reefs.

The Value of Reefs

Oceans cover 71 percent of Earth's surface. They hold 97 percent of the planet's water. We depend on oceans for the air we breathe. Ocean plants produce half of the world's oxygen. Ocean waters absorb carbon dioxide. The oceans also control the weather.

Coral reefs are the largest living structures on Earth. They play a big role in keeping our oceans healthy. Reefs also protect shorelines from storms and high tides.

Reefs provide food, protection, and spawning areas for fish and other marine life. And millions of people count on coral reefs for their food or income.

Reefs in Trouble

Unfortunately, increased human activity puts a strain on our oceans and reefs. Certain fishing methods damage reefs. Careless tourists, pollution, and climate change threaten the reefs, too.

In Cancún, Mexico, more than 400,000 tourists visited the natural reefs every year. Many were beginning divers. Their lack of skill caused damage. MUSA was created to draw people away from natural reefs toward artificial ones. It's working. Many people now visit MUSA instead of the natural reefs.

This natural reef in the Red Sea is full of marine life.



Getting Started

To protect natural reefs, we can start building artificial ones. Artificial reefs can serve different purposes. Some can prevent coastal erosion. They force waves offshore instead of landing on the coastline. Others can hold sediment on beaches. Still others are a habitat for aquatic life.

How do you build an artificial reef? A large object is installed where the sea bottom is flat and has no features. As ocean currents flow in this area, the number of plankton swell up. Small fish can now feed. This, in turn, draws larger fish to the area. Over time, a complex community of sea life becomes connected to the object.



Artist Jason deCaires Taylor creates the face on one of the underwater statues.

Seeding Solutions

Creating an artificial reef takes time. MUSA president Roberto Abraham says that one of the challenges was using the right cement.

If the cement isn't strong enough, the statues crumble over time. If the surface is too acidic, corals and algae can't take hold and grow.

Once MUSA found the right mix, they were able to create the statues. Then, they hand-seeded many of them. They placed young staghorn coral polyps on the surface. The change is slow. "They evolve every day," Abraham says.


These statues have been underwater for several years. Corals and algae grow on them. Fish swim among them.



Repurposing Rigs

Art isn't the only way to make an artificial reef. Old oil rigs can also become reefs! Oil rigs are structures built in deep water. Usually, they are built on clay, mud, and sand. There, they drill for oil.

Some rigs no longer in use are turned into deep-sea artificial reefs. This program is called Rigs to Reefs. In the United States, many of the Gulf States participate. More than 500 rigs have been turned into reefs.



These corals grow on an artificial reef. They are surrounded by fish.



This rig may one day become part of an artificial reef.

Helping Out a Giant

A rig can provide a habitat for as many as 14,000 fish! It can support more marine life than natural reefs do. The steel is a good surface for corals and sponges. Red snapper, hogfish, and barracudas make rigs their home.

These rigs are even helping to bring back a threatened species. Goliath groupers have been protected since 1990. Still, they are at risk. In recent years, they have been most abundant near deep, artificial reefs.

Accidental Reefs

Some artificial reefs are not planned. These are made from objects that don't belong in the ocean at all. Planes that crash or ships that sink sometimes become reefs by accident.

There's a place in the Red Sea called Sha'ab Abu Nuhas. It is a coral reef off the coast of Egypt. Passing near it by ship can be dangerous.

Four large shipwrecks are found here. These ships struck the reef. Then they sank and slid down a steep slope. They were partly buried in sand. The *Giannis D* was such a ship. It was a transport ship hauling timber. In 1983, it accidentally ran into the reef. The crew abandoned it. A storm broke it into pieces. Then it sank.

To dive there now, you'd see it covered in corals. Hawksbill turtles, glassfish, and eels drift by. The sea has claimed this ship for its own.

Creating a Home

The S.S. *Thistlegorm* is at the bottom of the Red Sea, too. This British cargo ship sank during World War II. At the time, the ship was filled with supplies for soldiers. It also held weapons of war. Bombs. Rifles. Motorbikes. All still lie at the bottom of the sea.

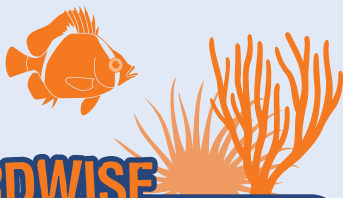


A Future Hope?

How strange these items look now. Encrusted with corals. Alive with fish. Nothing can replace a natural coral reef. Yet, artificial reefs can make up for some of the loss. In time, marine communities can thrive in these reefs.



Clockwise from left:
The wreck of the *Giannis D* lies on its side. A scuba diver looks at part of the *S.S. Thistlegorm*. A hawksbill turtle feeds on corals attached to the wreck of the *Giannis D*.



WORDWISE

artificial reef: an underwater structure made by people, typically built to promote marine life in an area

coral reef: an underwater ecosystem characterized by reef-building corals



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