Coral Heroes

Adventures on the Reefs of Towabonga

Secure International
OUR HEROES ...

LEATHERY CORAL
SAMY SMART
ELKHORN CORAL
JO GRUMPY
BRAIN CORAL
AL MOOSE
BRANCHING CORAL
DOC KRAKEN
OCOTPUS

Coral Reefs – Bursting With Life

Tropical coral reefs make up less than one percent of the seabed worldwide, astonishingly enough, they are home to thousands of animal and plant species. While vast parts of the seafloor are plain, soft bottoms hosting relatively few species, coral reefs burst with life! There are 1500 reef-forming coral species worldwide, most of them can be found in the sun-filled shallow waters of the tropics. Even in the cold and dark deep-sea you will find coral reefs; biodiversity hotspots amidst muddy and species-poor abyssal grounds.
**TOWABONGA REEF, NEAR A SMALL TROPICAL ISLAND**

**Hey you guys, what's all the commotion? My ink sac practically burst!**

**Hey, I just know better than you do.**

**Well, my grandpa says...**

**I don't believe you.**

**Hey, I just know better than you do.**

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**Al Moose**  **Samy Smart**  **Jo Grumpy**  **Brian Ramsay**

**I DON'T BELIEVE YOU.**

**MY FAMILY MAKES THE BIGGEST AND STRONGEST CORAL TOWERS.**

**NO WAY! WE'RE THE BEST BUILDERS HERE ON THE REEF. OUR HOUSES ARE INDESTRUCTIBLE! PLUS, I'VE ALREADY WEIGHT A LOT MORE THAN YOU.**

**MAYBE, BUT NONE OF YOU...**

**...CAN BUILD AS FAST AS WE CAN. WE BRANCHING CORAL ARE THE BEST, AND THAT'S A FACT! Hmmm, what's going on over there?**

**You always have to be right about everything.**

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**CORALS AROUND THE GLOBE BUILD HUGE REEFS, ESPECIALLY IN THE TROPICAL SEAS, WHERE THE WATER STAYS NICE AND WARM ALL YEAR ROUND — LIKE IT DOES HERE ON OUR HOME REEF — TOWABONGA.**

**ALL OF YOU RELAX. THERE'S ONE THING YOU'RE ALL RIGHT ABOUT.**

**AND I'M CONVINCED THAT IT'S US BRAIN CORALS.**

**NONSENSE NO WAY!**

**DON'T MAKE ME LAUGH.**

**WE'RE NOT FIGHTING — WE'RE JUST TRYING TO FIGURE OUT WHICH OF US BUILDS THE BEST PALACES AND CASTLES HERE ON THE BIG REEF!**

**BUT IF YOU WANT TO DECIDE WHO MAKES THE PRETTIEST BUILDINGS IN OUR UNDERWATER CITY, WE'LL NEED TO TAKE A CLOSER LOOK AT THE REEF AND ITS ARCHITECTS. WANT TO COME ALONG?**

**OH, HOW EXCITING!**

**SURE! IF I HAVE TO...**

**AND YOU'LL SEE THAT I'M RIGHT!**

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A short time later...

All kinds of different corals grow on our reef.
And each kind looks different!

We look like the horns of an elk — that's why we're called elk-horn corals.

Hey, look, that's my aunt and uncle over there.

All please be careful.

Free corals are called that for good reason; if you touch them, you'll burn your finger.

Hey, Doc Kraken, there's something wrong with this coral. There are slimy little hairs all over it!

Wiggle

Hmmm, let's take a closer look at those little hairs...

With my super-zoom magnifying glass.

Cool

Yeah!

Hey, Doc Kraken, there's something wrong with this coral. There are slimy little hairs all over it!

Wow, and they're moving all over the place!

They're not hairs; they're little tentacles.

Can I touch one?

Careful, Al; these tentacles are no laughing matter.
They’re fighting tentacles, and each one is full of tiny stinging cells. When you touch one, they shoot out little darts. It’s what the galaxy coral uses to fight off neighbors that try to move into its place.

Hey, I want to have fighting tentacles, too. Where can I get some?

What are the short tentacles for?

The short tentacles are full of stinging cells, too. Corals use them to catch their food, like the tiny crustaceans that swim in the waters here, especially at night.

Hey, I want to have fighting tentacles, too. Where can I get some?

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Here, hold your hands under the magnifying glass.

Here you can see one of the thousands and thousands of polyps that make up a coral. The green spots...

That’s right, Samy Smart. The green spots are like tenants in the coral — little green algae that live inside their bodies.

Now it isn’t, on the contrary.

You corals are lucky to have these algae. With a bit of sunlight they produce plenty of sugar, some of which they secretly pass on to you — as a thank-you for keeping them safe.

Mmm. Tasty. I love sugar. It’s full of energy!

We all have algae inside our bodies, too!

That’s really gross.

Here you can see one of the thousands and thousands of polyps that make up a coral. The green spots...

Of course not, Brian Ramsey. Look, they’re not moving at all.

That’s right, Samy Smart. The green spots are like tenants in the coral — little green algae that live inside their bodies.

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And all you corals need that energy to grow, and to form your stony skeletons. Bit by bit, millimeter by millimeter. That’s how the impressive skyscrapers, terraces, shrubs and domes that you see here were built. A huge underwater city, all made of limestone from corals!

Yeah, but it’s almost too big.

...or fastest?

Elkhorn corals, of course. Just look at us: we grow so big and strong that even great big waves are broken up when they run into us, by slowing them down. We help protect the shore and the people who live there.

Well, I may never grow to be as big as you, AL.

But my grandma says that our reef would only be half as able to withstand the biggest waves and storms, like hurricanes. Without us heavy boulders, we’re like a protective wall around the reef!

Yeah, you’re right, so Grumpy plus, our city looks best with all different types.

Then let’s all focus on growing up big and strong! Together we’ll build a reef so big that it can be seen from space!

You know, I couldn’t care less about who the best builder is. What counts is that our reef keeps growing and everybody living in it is happy and healthy.
Octopuses are amazingly smart animals who belong to the molluscan class Cephalopods. They are able to change their skin color and texture to camouflage within their surroundings. The common octopus owns eight tentacles, each up to a meter long and lined with two rows of suction cups. He skillfully applies these tenacles, and can even use them to wield tools such as sticks. While using his parrot-like beak, he likes to crack open scallops and other shell bearing animals.

Elkhorn corals grow in the sunlight shallow waters of the Caribbean. They shield the coast by absorbing energy with their tentacles; some decades ago, they formed a protection belt along the coastline. Today, there are often only single elkhorn colonies left and the species can be found on the Red List of Endangered Species. Do you think their ‘antlers’ look like the ones of a moose?

Coral reefs are the greatest structures that have been built by living beings on earth. You can even see them from space! From the fossil record we know that coral reefs have existed for over 400 million years. The ancient corals who populated the reefs back then are called Rugosa and Tabulata and had a different way of building coral reefs as we know them today. Stony corals as we know them appeared around the time of the first dinosaurs. Modern coral reefs have existed for the past 60 million years. At present, coral reefs are threatened by a variety of reasons such as climate change, pollution and overfishing.

Stony corals build up the reefs. There are stony and soft corals. As well as sea fans and whips, soft corals, like tree corals, are often colorful and have tiny limestone nodules within their body. Their body is basically a building tube, stabilized by water pressure. Sea fans and whips have a flexible, horny skeleton, which allows them to sway with the current or swell. Often a feather star sits on top of a sea fan, taking advantage of its exposed spot to catch microorganisms. Elkhorn corals who build up at below the living coral forms the reef’s framework. This reef substructure is intervened by crevices and a kind of cave system, populated by sponges and other animals.

For well-studied coral species, scientists may be able to predict the timing of coral spawning almost to the minute. To synchronize their spawning, corals are guided by the lunar cycle to set the month, the time after sunset to set the exact hour. For instance, the elkhorn corals on Curaçao usually start their rendezvous at 9:15 pm on the dot and then spawn for about half an hour.

Friends and Foes

For corals to thrive, some indispensable helpers are needed. Fish and sea urchins grazing on algae prevent slow growing corals from being overrun by algae mats. This is especially important when enhanced nutrient levels promote algae growth. Sponges may grow fast as well, and there are sponges that bore into a coral’s skeleton. Once they are on track, those sponges may undermine a whole coral colony. To stand a chance against those nasty drillers, corals need to be in the right conditions, such as clear water and seawater temperatures within their comfort zone.

Scheduled offspring

Do your own research:

1. What’s your favorite coral species?
2. Where is the coral triangle and what is so special about it?
3. Which animals are native to coral reefs?
4. What is a basket star?
5. Which animals drill their tubes right into the coral skeleton?
6. What is the cement of coral reefs?

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... info and solving at www.secore.org Rubric Education
Al, are you sure tonight’s the right night?

Sure, I’m sure. Just look up there! You can see the August full moon; it’s the start signal.

Oh my gosh, I’ll finally get to see the miracle with my own eyes!

Oh my gosh, I don’t understand what everybody’s so excited about. What are we waiting for? And does anybody else hear that roaring noise?

Oh, great, here come the two-legged creatures with the strange windows over their faces. What tourists? At this time of night?

Oh no, they’re going to trample my tender limbs with their stupid fins again.

What does she think she’s doing? That’s our coral!

Al, what are you doing!?

Hey, rubber-skinned tourists, get lost! You’re ruining our stakeout!
What stakeout are you talking about?

We want to observe the miracle of coral spawning. Tonight, this huge elkhorn coral will sow the seeds for countless new baby corals.

But that's exactly why we're here, too. Because corals like this one need our help!

That's right, it's the night of nights. It only happens once a year, and you're intruding!

But that's exactly why we're here. Because corals like this one need our help!

Says who?

We corals don't need anybody's help!

You're right! Tonight, this elkhorn coral will release tiny packets of eggs and sperm into the sea. But for them to turn into new corals, the eggs from this coral have to come in contact with the sperm from another elkhorn coral, so they can be fertilized.

Now take a look around — where do you see the next elkhorn coral?

Yeah, there are countless elkhorn corals.

Mmmh, there must be one around here somewhere.

Hey, Al, I can only see one way over there.

And that's exactly one of the problems. There are now so few elkhorn corals growing on the reef that their eggs and sperm can hardly meet on the night of nights. In the past, there were so many of these corals that their spawning looked like a giant underwater snowstorm. But today the distance between the corals is simply too great. The eggs aren't fertilized and ultimately die.

And how do you want to help?

Come on, I'll show you.

Before the spawning starts, we carefully spread nets like this one over the corals. Once they start releasing their eggs and sperm packets like little balloons, we can catch them.

Several million, because all of the corals in a species spawn at the same time.

Hey, Al, I can only see one way over there.

Several million, because all of the corals in a species spawn at the same time.

What realy? Oh, how exciting!

Look, there are little white balls coming out of all the little openings.

How many are there? A thousand, hundred thousand, or million?

Several million, because all of the corals in a species spawn at the same time.
Wow, it really does look like snow!

Look, the fish are gobbling up the coral eggs and the shrimp are too.

Hey, stop that right now!

Oh no, you can’t just eat up all the coral spawn!

Shoo... get lost, you chowhounds!

And what do you do with the spawn that you catch?

On board, our colleagues carefully empty the spawn from all the corals into a large bin and very gently mix it.

It all has to be thoroughly mixed, but without doing any harm to the spawn. The eggs and sperm have to come together so little corals can start growing.

Oh my, you steal the coral spawn! And you call that helping?

We divers bring all of the containers full of spawn back to our boat.

You mean you steal the coral spawn and you call that helping?

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We take the box full of spawn to our floating coral pools, which are anchored in the bay.

Next, we carefully put all of the fertilized coral eggs in these pools, and then observe how they grow into tiny coral larvae.

At first, they don’t look like real corals, but they can swim.

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At first, they don’t look like real corals, but they can swim.
We’ve even developed a very special base for the corals.

Our Coral-Settlement Tile is shaped like a four-pointed star and covered with small grooves. The coral larvae can easily hide in these grooves, allowing them to safely grow their first few millimeters.

And how do the little corals come back to the reef?

Once the little corals on the settlement tile are a few months old...

... we take them back to the reef, where they can grow into strong, healthy and beautiful coral colonies...

... if the water stays clean enough.

In many parts of the world, the oceans are so polluted that the little larvae don’t have a chance.

And the little larvae often become covered with algae and die.

But here on Towabonga Reef, the conditions are good, and the coral babies are thriving. Take a closer look. Can you see our tiles with baby corals from last year?

Oh, the little corals are so cute!

You’re telling me they’ll be huge elkhorn corals some day? Don’t make me laugh!

It takes at least four years for the planted corals to reach the size of a football, and to be old enough to have babies of their own. But if a few years from now we once again have plenty of spawning corals here on the reef then the chances are good that we’ll see a lot more coral babies around here.

And as long as the elkhorn corals can’t make it on their own, we’ll keep helping them.
Okay, looks like the second vial is now full.

I've got to take it back to the boat and then check on the other nets with Tom. Maybe we'll see you again in a few months when we come back to plant more little corals.

Well, keep an eye on the babies, we promise!

That's right, corals help one another! And the sea urchins on our reef can help with those nasty green algae: they just eat them up.

Hey little guy, you'd better start growing. Look at how big I am. I bet you'll never be so big!

All stop messing with the little guy. If I remember right, three years ago you were just as small.

That's a good idea. We've got plenty of room.

Yeah, just keep an eye on the babies. We promise.

Hey, little guy, you'd better start growing. Look at how big I am. I bet you'll never be so big!

All stop messing with the little guy. If I remember right, three years ago you were just as small.

Hee-hee.

Munch.

Impressum

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