Lesson: “Why do some sea creatures look so strange?”

VIDEO TRANSCRIPT

EXPLORATION VIDEO 1

Hey, it's Jay from the Mystery Science Team. A while back, I was a guest at a family wedding. But this wedding was unlike any wedding I'd ever been invited to before. This one was underwater. The whole wedding took place in the ocean. Surrounded by blue water everywhere. The bride and groom and all the guests wore thick swimsuits, wet suits, to stay warm in the chilly sea. Everyone wore big masks and carried big tanks of air on our backs so we could breathe in the water. As the couple said their vows, we had to keep kicking our flippers so the waves wouldn't wash us away. It was definitely a memorable day. As a kid, sometimes I'd imagine what it would be like to live underwater. Maybe you've thought about this too.
Or imagine what it would be like to live like a character in an underwater story. But going to this wedding gave me an idea of just how tricky living in the ocean would be. The wedding ceremony was less than an hour long, and it took so much preparation and special equipment just to stay underwater that long. If you were really going to live in the water year round, you'd need an endless supply of gear. Air tanks, goggles, flippers, and wetsuits. Not to mention drinkable water and food supplies that wouldn't just get soggy or float away. Like, imagine trying to eat breakfast cereal at the bottom of the ocean. Yuck! Salty, sludgy cereal. For a human, actually living down here is nearly impossible. But for many animals, it's not impossible. While we were watching the wedding ceremony, we had some visitors who weren't on the guest list.

Including fish like these. For a fish, there's nothing special or unusually challenging about being underwater. That's where they live normally, of course. But why? What makes it so much easier for a fish to live underwater compared to a human?

EXPLORATION VIDEO 2

Fish don't need to bring complex gear with them to survive underwater. Everything they need to live in the sea is already part of their bodies. Instead of carrying an air tank, a fish's gills let them breathe underwater. Instead of wearing rubber swim flippers, a fish's fins help them move through the water quickly. A living thing's specific characteristics are called traits. Traits can include what a living thing does, behaviors like breathing or swimming, and what parts a living thing has, structures like gills and fins. These fish have traits such as gills and fins that make them well suited to breathing and getting around in the water. Human beings have traits, such as our lungs that help us breathe air, and our legs that can hold our weight upright that make us well suited to breathing and getting around on land. But breathing and moving aren't the only things an animal must do to stay alive. What about food? Gills and fins aren't going to help a fish survive for long if the fish can't find enough to eat. How do underwater animals get the food they need? You probably already have a basic idea of how this works, or at least you definitely know how it doesn't work. It's not like fish and sharks and squid keep massive refrigerators and snack cabinets on the ocean floor, right? They search for the plants they eat, or hunt for the prey, the animals, they eat. Every environment poses unique challenges for the animals trying to hunt prey there. What does it take to catch prey underwater? I wonder what you think. What might be challenging about hunting prey in the ocean? What traits might help an underwater animal find and catch their food?

ACTIVITY INTRODUCTION VIDEO

In today's activity, you're going to take a journey underwater to watch one of the most ferocious, terrifying, and capable hunters in all of the ocean. The frogfish? You'll watch videos of these funny looking fish to figure out how their traits help them catch and eat their prey. To keep track of this, you'll write down all of your observations in your handy field journal just like scientists do. You'll start off by focusing on how frogfish get close to their prey. Then you'll focus on how frogfish actually eat their prey. You'll use all of your observations as evidence to help you figure out the answer to the question, how do frogfish traits help them catch their food so that they can survive in the ocean? Are you ready to explore this undersea mystery? We'll get you started step by step.

ACTIVITY STEP 1

For this activity, you'll work with a partner. Each of you will make your own field journal. When you're done with this step, click the arrow on the right.

ACTIVITY STEP 2

Get your supplies.

ACTIVITY STEP 3

First, you're going to make your field journal. You'll use it to collect evidence from your frogfish observations. To start, flip each page over, then fold it in half along the gray line in the middle. Like this. The word should be on the outside. Then run your fingernail along the edge to make a good crease. Do this for both pages.

ACTIVITY STEP 4

Find the letters in the top corners of your pages. Stack them so the page with an A is on top and the one with a B is on the bottom like this. Then fold your pages in half like this. Run your fingernail over the edge to make a nice crease.

ACTIVITY STEP 5

For this step, you're going to take turns helping each other. Watch the whole step before doing this yourself. Partner 1, open your stack of pages and hold them together like this so that they don't move. Partner 2, cut along the dotted lines, like this. Then, partner one, flip the pages around and partner two, cut along the dotted lines on the other side like this. Do your best to stop cutting before the stop sign on both sides. When you're done, switch jobs and do the same thing for your partner's journal.

ACTIVITY STEP 6

Now you're going to connect your journal pages together. This step is a little tricky, so watch the whole step before doing this yourself. Layer pipe cleaner along the black line in the middle of your journal so that the ends are outside of the book like this. Then, tuck your pipe cleaner's ends into the cuts in the pages and loop them around the back. Finally, twist them together like this. Try your best to twist your pipe cleaner together tightly right up against the back of your journal. If it's too loose, your papers might fall out. When you're done, your journal will look like this.

ACTIVITY STEP 7a

This strange looking ocean dweller is called a frogfish. And so is this, and this, and this. There are many different species of frogfish, and they all look a bit different from each other, but they also have a lot in common. Discuss as a class. What parts of the frogfish's body, also known as its structures, stand out to you?

ACTIVITY STEP 7b

You may have noticed their color or their shape. But did you notice this thing on its head? Let's start our investigation by looking more closely at this strange structure. Click the arrow to move on.

ACTIVITY STEP 8

Let's see how the frogfish uses this strange structure. Pay close attention. We'll play the video a few times. What do you notice?

ACTIVITY STEP 9

Now it's time to write down your observations. Open your field journal to page one. Here you can break your observations into two categories. One, what you saw the frogfish do to get close to its prey (its behaviors), and two, what parts of the frogfish helped it get close to its prey (its structures)? Discuss what you observed with your partner. Then write your answers to questions 1A and 1B in your field journal. We'll keep playing the video in case you need another look.

ACTIVITY STEP 10

Now, you're about to see a clip of a different species of frogfish hunting for food. Observe closely. Pay attention to how it gets close to its prey. Just like last time, we'll play the video a few times. Don't worry about writing anything down just yet.

ACTIVITY STEP 11

Pow: lay pencils over the pencil lines and hold them in place. Crash: tape them down with long stickers to make barriers between each zone, like this. Next, lift up the end of your bumper jumper, and slide the landing zone sheet underneath it. Line up the end of the jump with the thick black line like this. Finally, tape the top corners of your landing zone sheet down with two small stickers so it won't move. Congratulations, you've finished making your bumper jumper. Now it's time to see it in action.

ACTIVITY STEP 12

Now look at questions 2A and 2B. Discuss the questions with your partner, then write your answers in your field journal. We'll keep playing the video in case you need another look.

ACTIVITY STEP 13

Now look at questions 3A and 3B. Discuss the questions with your partner, then write your answers in your field journal. We'll keep playing the video in case you need another look.

ACTIVITY STEP 14

In the last video, you saw a frogfish swallow a giant fish hole. How do its structures help it do this? Take a closer look. You're about to see a clip of another frogfish catching and eating its prey. This time in super slow motion. Observe closely. What do you notice?

ACTIVITY STEP 15

Now look at question 4. Discuss the question with your partner, then write down your answer in your field journal. We'll keep playing the video in case you need another look.

ACTIVITY STEP 16

Now you're going to put together everything you've observed about frogfish. Open your field journal to the frogfish drawing on pages 5 and 6. Your job is to circle and label all of the structures that help a frogfish catch and eat food. Use all of your observations from the videos to help. Circle and label at least three structures on the diagram.

ACTIVITY STEP 17

Flip your field journal to the back cover and find question 6. You should see the claim, "Frogfish have structures that work together to help them survive." Do you agree or disagree? Why? Discuss with your partner then write down your answer. Be sure to use the evidence you gathered in your field journal to support your answer.

ACTIVITY STEP 18

You've looked closely at the structure on the outside of a frogfish's body. But what about the structures on the inside? What structures might frogfish have inside their body that help them eat their prey? Discuss. What structures inside of a frogfish's body might help it eat prey?

WRAP-UP VIDEO 1

There's no denying it. The frogfish we met in the activity looked weird. I mean, this frogfish looks like a fuzzy, lumpy rock, and it has a wiggly worm-like thing attached to its head. But by observing frogfish in the wild, we collected evidence that helps us understand how these unique body structures help frogfish survive. We observed a frogfish swishing that wiggly worm thing on its head around in the water, which attracted prey looking for a snack. That gave us evidence that the structure acts like a fishing lure. We also gathered evidence that a frogfish's body helps it camouflage. We saw prey wander right up to a frogfish without noticing it. And once the prey got close enough, bam! We watched that huge mouth gulp it down whole. And maybe you noticed other structures that help a frogfish catch food, such as its eyes, which help it spot prey. Or those fins that help it stay on the ocean floor as prey approaches. A frogfish needs some way of getting close to its prey. And some way of eating it. This frogfish's lure, lumpy, camouflage body, and big mouth help it accomplish those goals. These traits are all external. They are outside of a frogfish's body. But frogfish also have traits inside their bodies that are just as important, internal traits. Just like the frogfish has a huge mouth, it also has a huge, stretchy stomach that can hold a lot of food. That makes sense, right? If a frogfish can swallow a whole fish in one gulp, it might be difficult if its stomach couldn't fit a whole fish at once. This expandable belly helps. One of these traits alone isn't enough to help a frogfish catch a meal. A

wiggly lure with no big mouth is just a wiggly thing. But together, with all a frogfish's other structures, it helps the frogfish survive. Each of these traits fits together with the others, a bit like puzzle pieces. When a group of separate things all affect each other and function together as a whole, we call this a system. A frogfish's many traits create a system that helps a frogfish eat. This isn't true only for frogfish either. Like check out another ocean creature, a reef squid. This animal can seem pretty strange at first too. But take a look at how this reef squid catches a fish. See if you can spot how its traits work together.

WRAP-UP VIDEO 2

Unlike a frogfish, a reef squid doesn't have a wiggly worm on its forehead to help it get close to its prey. But the reef squid can dart forward in a burst of speed that catches prey by surprise, accomplishing the same goal just in a different way. And once it gets close to its meal, those alien looking limbs on the front serve a purpose too. They help a reef squid grab on tight to its food. Even though a reef squid looks really different from a frogfish, its traits both internal and external also work together as a system to help it catch food and survive. The same is true for all animals that live in the ocean and all animals that live in the desert and in forests, and actually all animals everywhere. Every animal has traits that help it survive in its unique environment, including us. We're animals too, and we have traits that work together to help us survive where we live, such as our eyes that can help us spot food, our nimble fingers that help grip and grasp it, our many teeth that help us tear and chop it down, and our stomachs that help us digest it. These are called adaptations. Adaptations don't necessarily make it easy to survive in a particular place, but they help. Understanding how an animal's adaptations work together and what they help an animal do can help us figure out how they survive and why they look the way they do. These ocean creatures might look wacky to us but think about what would happen

if they didn't look this way. Without these adaptations, they might not survive here. Some of the traits that make them the weirdest are the traits that help them the most. So, stay weird, keep surviving, and stay curious.