

MOLLY BLOOM: You're listening to Brains On from MPR News in Southern California Public Radio. We're serious about being curious. I'm Molly Bloom. Allow me to introduce you to a few friends.

[HUMPBACK WHALE CALL SOUNDS]

That's the humpback whale. Beautiful song, right?

[WHALE CALL SOUNDS]

Oh, and that's the North Atlantic right whale and his up call. Hear how it goes up at the end?

[WHALE CALL SOUNDS]

[ORCA CALL SOUNDS]

And this whistling, squawking, snapping is courtesy of the orca, also known as the killer whale.

[ORCA CALL SOUNDS]

Most of us don't get to hear these sounds because we're not underwater. But thanks to scientists who record them, we get to know these marine mammals in ways that would not be possible otherwise. Heather Henahan is one of these scientists.

HEATHER HENAHAN: I work up in Woods Hole, Massachusetts. And I study marine animals, including whales, and dolphins, and fish, using sound.

MOLLY BLOOM: And Heather is here today to help us answer your questions about whales. Let's start by diving into this one from Maria in Baton Rouge, Louisiana. She writes, I recently heard that whales don't have vocal cords. If that is true, then how do they make sounds? First, we need to do a little defining about what we mean when we talk about whales. There are two types of whales, baleen whales and toothed whales.

Baleen whales include the humpback, right whale, and blue whale. Instead of teeth, these whales have baleen, which kind of looks like a scrub brush crossed with a fine-tooth comb. The baleen filters out water, but allows tiny prey to sneak through so the whale can get a meal on the move. Then, there are the toothed whales. Like the name says, they have teeth. Toothed whales include orcas, sperm whales, belugas, and dolphins. Yes, dolphins are a kind of whale. It blew my mind when Heather told me that. So now that we have the whale sorted back to Maria's question. How do whales make sound?

HEATHER HENAHAN: And that's actually a question we've been thinking about, and asking for quite some time, and something that we still don't know a lot about.

MOLLY BLOOM: But here's what we do know. Whales do not have vocal cords like we do, but the way they make sound is similar. In humans, air moves over our vocal cords, which vibrate and make different sounds based on the tension and shape that they're in. Toothed whales also move air, but not over vocal cords. They move the air through their blowholes. They have phonic lips inside the blowhole that vibrate when air passes over them.

Baleen whales, on the other hand, use their larynx to make sounds like we do. And while they don't have vocal cords exactly, they have something called a U-fold which is similar to our vocal cords. The U-fold is attached to a sac that is used to move air over the fold. But here's why we don't know a lot about the way whales make noises.

HEATHER One, because of their size. Two, because they live underwater.

HENAHAN:

MOLLY BLOOM: You can't just hop on a whale's back with body scanning machines, waiting for them to make a noise. You can record the sounds, but it's hard to see what's actually happening with the whale's anatomy. So on to the next question.

HOUSTON LOVETT: Hi, I'm Houston Lovett. And I'm from SLO, Texas. And my question is, how do humpback whales communicate?

MOLLY BLOOM: That's an excellent question. And the sounds that humpback whales make and other marine mammals make, they're not just for fun, they're very important.

HEATHER Whales and Dolphins rely pretty heavily on sound to communicate with each other. Sound travels fast, and it travels far in the ocean. And it does a lot better in water than it does in air. So they use-- collectively use sound to find each other, to find their prey, find their way around. The nice thing about using sound to communicate is that it works when sight doesn't. They can call out and listen when it's nighttime, when water is murky.

MOLLY BLOOM: The clicks produced by toothed whales are used for echolocation.

HEATHER They send out sound, it bounces off of something. And then, the echo coming back tells them something about what it is, where it is. And they use it to navigate, to find their food. The echo doesn't come through their ear. It actually comes through their jaw. And they're not actually using their ear to receive the sounds like we do. They don't have external flaps like we do, that help us focus the sound and listen in. But they're actually receiving the sounds through their jaws.

MOLLY BLOOM: The other sounds are mostly social, and they vary between species. We don't know what all the calls mean, but scientists have found that bottlenose dolphins make signature whistles.

HEATHER And these whistles are basically their name. And it would be really annoying if I walked around saying. Heather, Heather, Heather, Heather, Heather. But it's like they do that. And so they have a whistle that means, sort of means Heather. And then that way, if I came across another dolphin, I could do my signature whistle. They would know it's me. And maybe they would mimic my signature whistle. And that would acknowledge that I was there, like handshake.

So we do know that dolphins have signature whistles. And we know that they do convey information through these whistles. But we definitely can't go from this whistle means shark or this one means fish. But we know that they're definitely conveying information through those whistles.

MOLLY BLOOM: And those humpback whale songs are mostly made by males and are likely used to attract a mate.

[WHALE CALL SOUNDS]

We'll be back with more about whales in just a bit. But first, I need you to use your ear flaps to decode something for me, it's time for the mystery sound.

[MUSIC PLAYING] Mystery sound.

Here it is.

[SNORING SOUNDS]

Any guesses? We'll be back with the answer later in the show. Are you a fan of Brains On? If you are, consider leaving a review for the show in iTunes. It really does help other kids and parents find out about the show. You can also keep up with us on Instagram and Twitter. We're at Brains_On. And we're on Facebook too. And if you've listened to Brains On before, you know this show is powered by our listeners. All of our shows are inspired by questions and topics from you. And we also love seeing your drawings, hearing your mystery sounds, and receiving your high fives.

So, to say thank you to all of you who keep this show going with your energy and ideas, we started the Brains honor roll to give all of you a shout out. If you've written to us, we will get to you, we promise. But we're hearing from so many of you, and it's awesome. But because of that, there's a bit of a wait. So thank you for your patience. Without further ado, here's the most recent group to be added to the Brains honor roll.

[LISTING HONOR ROLL]

[MUSIC PLAYING]

Now, back to the whales. I've been holding my breath in anticipation of this question.

GIRL 1: My name is Jillian.

GIRL 2: My name is Phoebe. We're from West Sacramento, California. And we want to know how whales stay underwater very long.

MOLLY BLOOM: This is a good question. And it's also an excellent time to remember that whales are mammals just like us. They can't breathe underwater like fish can. They need to breathe oxygen from the air like we do. So how are sperm whales, for example, able to stay underwater for an hour and a half at a time? Heather says it's almost as if whales use scuba tanks.

HEATHER HENAHAN: So the first thing is the size of the scuba tank. And the second is how you take the air out of that tank. They have big scuba tanks that they take down with them. And that oxygen is not only in their lungs, but also in their blood and their muscles. And blood and muscles can hold a lot of oxygen. So that makes their scuba tanks really, really big. And they're really good at efficiently taking the air out and getting the most out of the oxygen that they've got. So they do things like they slow down their heart rate, they prioritize where oxygenated blood is going. So you can imagine, that would prioritize brain and heart.

MOLLY BLOOM: But they do run out of oxygen and eventually have to come to the surface and replenish their tanks. The location of their blowhole however makes this pretty easy.

HEATHER So the blowholes, they use them like our noses for breathing, except their noses have moved to the back of their heads. And that's convenient because then they only have to put the top part of the back of their head out of the water, and they can breathe. So they can keep moving, and breathing, and quickly inhale and exhale, and dive again without needing to bring their entire heads out of the water. It makes it much more efficient. And the blowholes close and open pretty quickly. If you go swimming and you use a nose plug so you don't get water up your nose, the blowholes act like a permanent nose plug.

MOLLY BLOOM: Toothed whales have a single blowhole on the back of their head, but baleen whales have two. They're right next to each other, so it even looks like nostrils for those whales. But this might not be what you're used to seeing in cartoons and drawings.

HEATHER The whale and *Finding Nemo* has one blowhole. But it's a big baleen whale, it should have two. You know how Marlin and Dory come out of the blowhole? That can't really happen. Because they would have gone right to the stomach. There's a couple of things about *Finding Nemo*. And I love it, it's my favorite movie. But there's some things, there's some things, among other things.

MOLLY BLOOM: Heather loves studying marine mammals because scientists are always learning new things about them.

HEATHER Before August of this year, I would have said that dolphins and whales use their nose for breathing and their mouth for eating and don't use their mouths for breathing. But then, scientists discovered a mouth-breathing dolphin in New Zealand. And so, never say never. So we're learning new things about sounds that these animals are making, probably we could say every day. And we're coming closer to figuring out how they're making their sounds and what types of anatomy and physiology they have to make them.

MOLLY BLOOM: And speaking of nostrils and breathing, that's a clue. I think we should get back to that mystery sound. Let's hear it one more time.

[SNORING SOUNDS]

Here's Ellery and her mom, Sarah, with the answer.

GIRL 3: I recorded this when my dad was asleep. He snores a lot.

I think it's funny.

WOMAN: Does anyone else in your family snore?

GIRL 3: Both of my grandpas, and one of my grannies, and maybe my great granny. My mom does a little.

WOMAN: No. What does it sound like?

GIRL 3: It sounds like a little panda pounding the paws on a ice cube, very soft.

[MUSIC PLAYING]

MOLLY BLOOM: That's it for this episode of Brains On. If you have a mystery sound you'd like to share with us, or a question, or a drawing, you can send them to us anytime at brainson@m, as in Minnesota, pr.org. You can also head to our website brainson.org to find our mailing address. And while you're there, you can listen to all our past episodes and sign up for our newsletter. We'll be back soon with the epic fire versus lasers debate. Thanks for listening.