But Why: A Podcast for Curious Kids

Why do armadillos have shells? Why are sloths slow?

December 2, 2022

Jane 00:20
This is But Why: A Podcast for Curious Kids, from Vermont Public. I'm Jane Lindholm. On this show, we take questions from curious kids just like you and we find answers. We love hearing the questions that are on your mind. Since we started, you've sent us more than 12,000 questions! And so many of them are about one thing: animals. You know what? That's okay with us, because Melody and I love animals as much as you do. So today we're going to talk about two different, but related animals. They're come from an interesting group of mammals called Xenarthra. This is a group of animals that share some characteristics, including that they all look pretty unusual. These animals originally started out in South America and eventually moved into North America a couple million years ago. Most of the animals that fit into the Xenarthra category are extinct now, including a giant ground sloth that was up to 10 feet long. But there are still three types of animals alive today that fit into this category: anteaters, sloths and armadillos.

Jane 01:29
Did you know that those animals are related? When we say something is related, we don't mean they're cousins. We mean that way back in time they shared a common ancestor. And through the process of evolution, those animals changed to become separate species. So anteaters, sloths and armadillos are all different, but related, and today we're going to talk about two of them. Armadillos branched off from sloths and anteaters about 60 million years ago. So let's start with them.

Jane 01:59
If you want to see most types of armadillos, you have to go to Central or South America. But one species, the nine-banded armadillo, has moved northward into the United States.

Michael Perez 02:09
States including Arkansas, Louisiana, Mississippi, Alabama, Georgia, and so forth. It doesn't really expand much north of, say, Nebraska, because it's getting too cold there. They are a mammal; they do have hair, but they don't have very much hair. So being in a warmer environment is going to be best suited for it.

Jane 02:27
That's Michael Perez. He's the natural science supervisor at the Fort Worth Nature Center and Refuge in Fort Worth, Texas. Melody and I paid Michael a visit to get a little more information about armadillos and to try to see one for ourselves. But Michael warned us right from the start, they're not easy to spot.
And they're mostly out at dawn, dusk or after dark when it's not so hot. But we still wanted to know what to be on the lookout for.

**Michael Perez** 02:53
It's a small mammal. It has...it's an overall gray body with a relatively long tail. The main description of an armadillo or thing to look for is an armored shell. It's like, imagine a turtle without the bottom part of the shell. It's just the top part. And it has some flexibility to it. But that's what is protecting the animal.

**Jane** 03:17
In fact, the name armadillo in Spanish would be armadillo, which would be little armored one.

**Michael Perez** 03:21
Little armored one, exactly, right. So it does have that armor on it. And it actually is covered on its head as well, a little bit. It has a very pointy nose, little pointy ears as well. Not very not well known for its ability to smell or to see. So whenever it's going for food, it's rummaging through the ground digging around for its for its food.

**Jane** 03:42
That shell that gives the armadillo its name is probably the thing most people know about these animals. And Cecil had a question about it.

**Cecil** 03:50
I'm five years old. I live in North America. How do armadillos get their shells?

**Michael Perez** 04:00
They're born with their shell. And it starts off pretty soft, but over time it hardens. And basically the top layer is kind of a layer keratin, very similar to your fingernails and hair and so forth. And then below that you start getting into bony-like material. So that's what gives it the the hardness and the ability to armor off if you will, predators and so forth.

**Jane** 04:20
And the point of the shell is to protect the animal from predators?

**Michael Perez** 04:24
Definitely. The armored shell does protect it. It's a very hard surface. Now there are some animal predators that can actually get through that. But for the most part, it is for protection. Yes.

**Jane** 04:34
Who are the predators of the armadillo?

**Michael Perez** 04:37
You can have around here, in our area, we have coyotes, we can have alligators--we are in Texas and we do get alligators, so if they're near water, alligator's a predator. Other places that may have, bear can be a potential one as well. Just something with you know strong teeth that can basically get to it.
Jane 04:54
How about cars?

Michael Perez 04:55
Oh, cars are probably number one. Now one of the things we talked about how the armored shell is helpful to protect it. One of their behaviors, or one of the things that they do is they can jump really high. They jump really high. So as it's going on the road, as I said earlier to eyesight is not very great. So as they’re walking across the road, they get startled when the car’s coming, they’ll jump and they just basically hit the undercarriage of cars and, unfortunately, leads to their demise. And they can jump, you know, three or four feet high. It’s actually a good defense for them to in a sense that outside of the road, but if they’re startled, and they jump, that’s going to startle you as well. At least it’ll startle me if you see somebody just jump vertical a couple feet, and I’m like whoa, I’m gonna back up too. if I was a predator, I probably would initially jump back to and then that would be a space of given initial time to get away escape its predator.

Jane 05:44
So there are lots of dangers for armadillos, and startling potential predators by jumping straight up in the air is a pretty good trick. But there’s another way armadillos try to protect themselves. Five-year-old Charlie from Utah has a question about that.

Charlie 05:59
Why do armadillos roll up into balls?

Michael Perez 06:01
Well, they have the flexibility as any other mammal do, they can basically curl up. Now one of the things that people assume, or think they do, is curl up in a ball. Now there are about a roughly approximately 20 different species of armadillos. And there are only two that actually have the ability to completely curl up. And those I believe, have like three bands. Now the armadillo that we have here in the U.S. is called a nine-banded armadillo. So it doesn't have the ability to completely ball up. But there are some that do that, but it can just tighten up and you know, try to have its body wrapped up as much as it can underneath that hard surface. But it can't complete ball up.

Jane 06:46
But the hard surface, is it like different pieces of armor so that the armadillo can move or is it one hard solid shell like a crab?

Michael Perez 06:55
No, it's broken up there's bands, again, depending on what time type it is like the three-banded armadillo or the ones we have here in Texas and in the U.S., nine-bandeds. So it gives it the flexibility that it can be well more mobile, and you know, it can move around instead of one single shell like a turtle or what you described as crab.
Anything else cool about armadillos we should know?

Michael Perez 07:18
Whenever they have, they're young, they have quadruplets. Not all the time, but most of the time they have quadruplets. Well, I think that's kind of fascinating. Imagine that, you know, oh, we have four kids, four identical kids, you know, every time that's like, oh my you'd probably get over that pretty quick. So I think that's very fascinating, a very fascinating fact about armadillos.

Jane 07:37
Some armadillos can live as long as 23 years. But in the wild, they generally live about 10 to 12. As I said, Melody and I really wanted to find an armadillo. So before we went to wander off through the wildlife refuge, we asked Michael, where we should look.

Michael Perez 07:52
You're going to look for a place with a lot of leaf litter down, because underneath the leaf leaf litter, you can have small invertebrates, insects, and so forth. So you want to go to an area like that. Second, you want to look at your soil type. And yes, I said "soul," not soil. I'm in Texas, I say "soul." So you look at the soil type. And if it's loose and sandy, it's easier for them to dig. So those are the two components. If you're trying to find one, find some leaf litter, find some some loose soil. And that's a better, you're going to increase your chances of seeing an armadillo. And the signs of an armadillo, that there was one around is basically just a small little burrow in the ground that they dig looking for grubs and insects and so forth. Most of the time, you're going to see them most active at night just as the sun's going down and the sun's coming up. We do find them out here during the day as well and usually see them before you - you hear them before you see them because they're rustling through all the leaf litter and you'll find them then.

Jane 08:49
Do they make any sound?

Michael Perez 08:51
I have never heard of an armadillo make a sound. I think they may hiss, not hiss like a snake, but a release of air as they're running. But most of the sounds that you hear, it's not so much than making a sound directly, it's indirectly with the leaf litter and so forth as they run away. And they're pretty quick. They're pretty quick, when you seen one run.

Jane 09:10
Oh really?

Michael Perez 09:11
Oh yeah. Oh, yeah. After they've jumped after they jump they're scared you then there they can move on.

Jane 09:16
After we said goodbye to Michael we hopped in our rental car hoping that even though it was unlikely we'd see an armadillo in the 20 minutes we had before the park closed. And what do you know, we saw not only one but three. And I have to admit something to you now. Any good radio or audio reporter knows that you should have your recorder running just in case something exciting happens. But Melody and I were so sure we wouldn't see an armadillo that we had already put all of our equipment away. And then as we drove toward a pretty little lake to look for birds we saw these three armadillos digging through the dry leaves looking for things to eat. We were so excited but we didn't want to scare them. So we hopped out of the car and tip-toed over silently watching and we filmed them with our phones. So we do have some videos of these little critters we can show you if you head over to our Instagram, TikTok or YouTube channels we're at ButWhy_Kids. Anyway there you have it your questions about armadillos answered, coming up in search of sloths.

Jane 10:22
This is But Why: a Podcast for Curious Kids. I'm Jane Lindholm and today we're learning about sloths and armadillos, very cool North and South American animals. Sadly, we don't have sloths in North America anymore. But we used to. In the time of the mammoths, North America was home to giant ground slots that were nine to 10 feet long, and weighed more than 500 pounds. By comparison, today's sloths are less than 20 pounds and only a couple of feet long. Modern sloths come in two varieties, two-toed and three-toed, and both kinds live in Central and South America. You've sent us quite a few sloth questions, so we reached out to someone who knows those animals really well.

Sam Trull 11:07
Well, my name is Sam Trull. And I am originally from the United States, but I've been living in Costa Rica for the past 10 years. My background was actually originally with primates. So I studied to be a primatologist. And I first came to Costa Rica to work with primates. And then I met my first sloth. And I stopped working with primates at that point, and started focusing solely on sloths. Mostly because they, there's just so little known about them, and there was a lot of need to help them.

Jane 11:40
Several years ago, Sam co founded the Sloth Institute, a place where they study sloths, helps sloths that can't live in the wild, and work on sloth conservation, which basically means looking for ways to make sure all sloths are able to survive and thrive. Now, even if you don't know much about slotsh, you probably have heard they are slow. And a lot of you want to know why.

Noelia 12:02
My name is Noelia, and I live in and I'm four years old, and I live in Chicago, and why do sloths move slow?

Sawyer 12:15
Hi, my name is Sawyer. I'm six. I live in Lawrence, Kansas.

Matthew 12:20
Hi, my name is Matthew. And I'm eight years old and I'm from New Jersey.
Erin 12:28
My name is Erin. I am seven years old. I live in Homewood, Illinois.

Brooke 12:35
I'm Brooke. I'm four years old. And we're from Reno, Nevada.

Toby 12:42
Hello, my name is Toby and I'm four years old. And I live in Lubbock, Texas. And my question is why do sloths move slow?

Sam Trull 12:50
Sloths are slow for, I always say, for basically two reasons. One, to conserve energy. And the second reason is to be invisible in the forest. Because both of those things keep them alive. By conserving energy, they, you know, literally conserve the life force of their body. Because they don't intake a lot of calories, you know, leaves, they find leaves very delicious, but leaves don't have a ton of calories. And so they can't really exert a lot of energy for that reason. And then they also need to be invisible from predators. Unfortunately, for sloths, especially for three-fingered sloths, for example, pretty much like any kind of predator can eat them at different stages of their life. When they're smaller, you know, smaller size predators, and when they're bigger, bigger size predators, so they're constantly on the lookout and and worried if someone is trying to eat them. And so by being slow, they're extremely quiet, they don't move the branches a lot, you can't hear them, so that helps prevent predators from finding where they are because they can't see or hear the sloths.

Jane 13:59
You mentioned that there are three-fingered sloths and I assume they have three fingers, how many fingers do other sloths have?

Sam Trull 14:06
So there's two different kinds of sloths, two-fingered and three-fingered. And we say fingered instead of toed, even though classically they were known as two-toed and three-toed because that's actually a misnomer. Because when they first started calling sloths two-toed and three-toed, they were thinking that all of their limbs were the same, like basically all legs, but they're not. Again, they're a lot more like primates where they have arms, and they have legs, and the difference in digits is on their hands. It's not on their feet. So two-fingered sloths, very different from three-fingered sloths, but they do actually have a lot of similarities. But sloths are actually the most extreme example of convergent evolution in mammals and convergent evolution means when two types of animals throughout time evolved similarly, because they live in similar habitats, they don't evolve similarly because they have a common ancestor. So scientists actually think sloths have been evolving separately for at least 40 million years. So the similarities between the two-fingered and three-fingered that you see are from that convergent evolution, not from a common ancestor, which is pretty mind blowing, because they do have a lot of similarities. But they do also have a lot of differences. And it's not just the number of fingers. They have different numbers of cervical vertebrae, they have slightly different diets because three-fingered sloths are strict herbivores and two-fingered sloths can actually eat a little bit of animal matter. So they're slightly omnivorous. Their behaviors are totally different. Two-fingered sloths are known for being
extremely aggressive, we have to be very careful when handling them, because they have very strong jaws and powerful teeth. And the three-fingered sloths are a lot more mellow, don’t get me wrong, they still try to attack they’re just not quite as good at it. They look very different. They have different colored hair, different features on their face, the way they climb through the trees is different. Two-fingered sloths are a lot more upside down when they’re climbing. Like the way that they look, they always look with their head upside down. And three-fingered are a little more upright, there’s just a lot of different things involved in working with either two-fingered or three-fingered.

Jane 16:11
That's pretty cool. Convergent evolution is when animals are adapting similarly, because of shared habitat, not because of common ancestors, they’re still more closely related to each other than they are to say humans. But the main reason they have some of the same characteristics is because they live in similar places, and developed their bodies and behavior to match that habitat. But back to their speed.

Eve 16:36
Hi, my name is Eve. I'm seven years old. I live in Bangkok, Thailand. And my question is, what is the fastest speed that sloths can get up to on land?

Sam Trull 16:49
You know, we've never actually clocked a sloth on land. That's, so that's a great question. And actually, it makes me want to do like a little sloth race and see exactly how fast they can go. But it is definitely a lot faster than you would think. For example, if they do usually move faster than you know what you would see like a turtle. I would say they could probably go, maybe I want to say like five feet, in maybe 15-20 seconds. The other thing too as they they move slowly, of course, but they can obviously they can definitely move faster than what you might normally see. But they also when they're afraid they don't move at all. They do this behavior where we call, it's like a freezing behavior. So sometimes people can interpret their slowness or their like non-movement for them just being a sloth, but it could actually mean that they're scared. Like, for example, have you approach one in the wild, and it's coming down a tree. Well, they're coming down the tree, probably to go to the bathroom. But if you get too close, they might freeze and not move at all. And so some people might think, Oh, she's being a slob. But actually they're afraid because you're close by so they've stopped moving. So they can stop and start. But if they're just moving along and not afraid, then I would say that's about how fast they could go.

Micah 18:07
My name is Micah, I'm seven and a half years old. I live in Appleton, Wisconsin. And my question is do sloths do everything slow?

Jane 18:17
Do sloths do everything slow?

Sam Trull 18:19
They definitely do not attack slowly. I mean, they can swat just as quickly as almost any other mammal I've worked with, like maybe not quite as fast. Like for example, monkeys are crazy fast in the way that
they can jump and things like that. But the swiping action that two-fingered sloths do is extremely fast and their biting action is extremely fast. So we we definitely have to be at our most aware. Because when we rescue a sloth, let’s say it was just attacked by a dog, they obviously don't know that we're coming to help them. They were just attacked by a dog and very afraid. They think that maybe we’re just a predator coming to get them. So they resist the actual rescue process. So we have to be very aware and make sure that we don't get hurt, and that we properly restrain the sloth and get it into the kennel so we can get it back to our clinic. And yeah, they can definitely defend themselves extremely quickly.

Jane 19:11
Here’s a question from Cameron that we weren't sure about.

Cameron 19:14
I'm five and a half. I live in Ohio, Twinsburg. Why do sloth fall down when they're fast?

Jane 19:23
Sam says sloths aren't known for falling down when they're trying to go fast. But they do sometimes fall from the trees.

Sam Trull 19:29
Sloths, um, in general are pretty good at falling in that they actually have extra rib vertebrae and so they protect their organs a little bit more than maybe other mammals that aren't as good at falling. And they're just very sturdy. So as long as they're falling on like a soft like forest floor for example. They're not falling on any human structures like buildings which are very hard, or like extremely big hard river rocks or boulders. Those things can be dangerous as well. They can actually fall from like twenty meters and be totally fine. We've seen that multiple times. They will move quickly in the trees when they're trying to get away from something they're afraid of like other sloths, because sloths will fight each other as well, especially males when they're fighting over territory, i.e. fighting over females because the females live within their territory. And so we actually have seen sloths move really quickly to get away from other males. And when they are moving really quickly, they’re not moving as deliberately and making as intelligent of choices as they normally would. So, he actually does have a good point in that if a sloth is moving really quickly, they might be more likely to fall because they're not really thinking about what branch they're choosing to make sure that it's a good branch that isn't going to break.

Jane 20:42
Annie is another kid who was wondering about some of the things that you've just been talking about.

Annie 20:47
I'm six years old, I'm from Little Rock, Arkansas. My question is, how do sloths get away from predators?
First and foremost is being invisible to trying to hide, so the best thing is to try to keep the predator from knowing they’re there. But if the predator knows that they’re there, one thing they can do is move to a part of the tree that the predator can’t really follow them. For example, here in Manuel Antonio, where we work their top predator is the ocelot and ocelots can get them up in the tops of the trees in the canopy and also on the ground. Because they’re extremely good climbers. However, they’re not quite as good climbers as sloths, and they can’t go to the little tiny ends of the branches like sloths can. So if a sloth were to go out to the the edges of the branches, that would be very helpful to avoid something like an ocelot because they would not be able to follow them. And then they would obviously just stay there until the ocelot gives up and goes to get someone else. That wouldn’t work so well for birds of prey that obviously are coming from above. Which is why in general, hiding is the best. And then however, we have also seen sloths again, like two- 3 fingers, especially fight off predators, and they SWAT and they buy and they basically just tried to make the predator think, oh, this is too hard. I'm going to find someone else.

Lucas 22:03
Hello. My name is Lucas. I'm four years old. And I'm from Alberta, Canada. I was wondering why sloths have long nails?

Sam Trull 22:22
Oh, I love that question. What's interesting is that the claw part that you see, is like you very accurately said more like their fingernails because there's bone underneath that. It's the last like bits of their fingers and their toes are within that keratin sheath which is like fingernail material. And it goes to about three-fourths of the length of what you see is bone underneath. And the reasons for it are probably because it really helps them climb, you know, they’re able to grip really well with that. They can grip big trunks with the sharpness of the ends of their nails. And they can also defend themselves with it. They have extremely strong grip with those fingers and those toes, they have special tendons in their fingers and toes that allow them to hang without exerting any energy. Because they just hang in it automatically the tendon locks on what they’re hanging from. And again, that helps them to conserve energy. So the way that their fingers and toes are shaped with the keratin sheaths really just kind of do a blend of things for them, helping them climb helping them protect themselves. And with the special tendons, they’re able to really conserve a lot of energy.

Jane 23:43
Long nails are just another way that sloths have evolved to adjust to their environment and defend against their natural predators. But sloths don’t have defenses against unnatural predators. Some of the new threats facing sloths are caused by humans. A big one is forest fragmentation. Where there are things like roads, houses, parks, and other things that can break up the forest. Sloths can only move safely up in the treetops, so roads and cleared land can be a danger to them. Another big problem is powerlines.

Sam Trull 24:16
And oftentimes the electric cables that go along the roads, they also will go through the forest and get very close to the trees, but they’re uninsulated most of the time because that’s the cheapest way to do it. And so when sloths get onto uninsulated wires, that's how they get electrocuted, and electrocution in
sloths can be deadly. We've got a pretty good success rate of saving sloths from electrocution and
being able to rehabilitate them or at least come back to the wild. But a lot of times, ones that do survive
still lose a limb. We've had multiple sloths we've had to amputate arms. They can also be hit by cars,
but we see that a lot less around here because luckily most people will see a sloth, you know, ahead of
time, and obviously, luckily, most people don't want to hit a sloth on the road, but it definitely can
happen. And we've definitely rescued many sloths from the middle of the road. And then because of
habitat fragmentation, and having more dogs in their environment, which you already said, is an
unnatural predator, because domestic dogs are not supposed to be in the jungle killing wildlife. There
also can be an increase in diseases, or an increase in stress to their system. So so maybe there's
natural diseases out there that they're more susceptible to, because their immune system is more
stressed out, because they have a lot of light pollution from the houses that are around or noise
pollution from the parties that are around and those things like stress them out, because they're just
going to sit in a ball and like wait for the thing that's scaring them to end before they go on to find food
for the night.

Jane 25:49
So if kids ever have an opportunity to see a sloth in the wild, should they not take that opportunity?
Because humans are helping to contribute to some of the dangers to sloths. How can kids who are
really excited about everything you're talking about be the best helpful people to sloths?

Sam Trull 26:09
I would definitely say take the opportunity to see sloths in the wild for sure, just make sure you're going
with an ethical tour operator. And by ethical tour operator, I mean, someone that isn't going to make
noises at the sloths to get them to look at you, or let the tour group stay around too long to if a sloth is
coming down to the bathroom, don't use flash photography, things like that. But absolutely see them in
the wild because I mean, even though an overgrowth of development is bad for the sloths, ecotourism
can still be very good for them. Because if there weren't tourists coming to see the sloths in these
places, what might they do to the forest to make money instead? So there's definitely an ethical way to
do it, you just need to do your research on the best places, and people to go see sloths with. And for
sure, it's better to see sloths in the wild than to see them in cages. There are a few AZA-accredited
zoos in the U.S. And those are places where you could see sloths, but there are also a ton of unethical
facilities in the U.S. And usually you can pick those out really easily. I mean, if it's any kind of crazy
offering, like come do yoga with sloths, like, that's not ethical. If they have baby sloths alone by
themselves that they're passing around and saying here, hold and take pictures with. That's not ethical,
most of those sloths are actually coming from the wild. Sadly, it's legal to purchase sloths from the wild
in the U.S., it just depends on the country where you're purchasing them from. So if it's an unethical
facility like that, you're going to see things like babies alone, they're going to be pushing, holding them
and taking pictures and feeding them or doing crazy activities around them. Because really, they're just
trying to make money for their own facility that has nothing to do with conservation or education. And
they're definitely purchasing the animals from the wild. So for sure, do not support those places. And
when you do, if you are lucky enough to get to come to Costa Rica, just make sure you're visiting
national parks with guides and people that are going to help show you responsible wild sloths.

Jane 28:11
So make sure to do your research before you go see any sloths. Thanks to Sam Trull of the Sloth Institute for telling us about sloths and to Michael Perez of the Fort Worth Nature Center and Refuge for telling us about armadillos. That’s it for this episode. If you have a question about anything, have an adult record it. It’s easy to do on a smartphone using a voice recording app. Then you can have your adult email the file to questions@butwhykids.org. We can’t answer every question we get. But we do love hearing from you and knowing what’s on your mind. It helps us decide what to do episodes about. But Why is produced by Melody Bodette and me, Jane Lindholm, at Vermont Public and we’re distributed by PRX. Our theme music is by Luke Reynolds. We’ll be back in two weeks with an all new episode. Until then, stay curious!