

ABBY: You're listening to *Brains On*, where we're serious about being curious.

CHILD 1: *Brains On* is supported in part by a grant from the National Science Foundation.

[DOORBELL RINGS]

MOLLY BLOOM: I'll get it!

[DOOR OPENS]

Hello?

MOLAR: Hey, down here, compadre.

INCISOR: Greetings and salutations and hello!

MOLLY BLOOM: What the what? Talking teeth?

CANINE: We do more than talk. We also walk the Earth, see the sites, meet the people, and maintain a very popular travel blog.

INCISOR: It's called *The Adventures of the Wandering Teeth*. We're the wandering teeth. And it's all about our adventures. We've been keeping the blog ever since we fell out of a mouth a few years back.

MOLLY BLOOM: Wait. So you are all lost teeth?

WISDOM: Not all that wander are lost, Molly.

MOLLY BLOOM: [GASPS] It knows my name!

MOLAR: Chaaa, of course! I'm Molar, by the way.

INCISOR: Hiya, I'm Incisor. I'm so thrilled to meet you.

CANINE: They call me Canine. And that's Wisdom over there.

WISDOM: The only true wisdom is knowing that you know nothing. [CHUCKLES]

MOLAR: We're huge *Brains On* fans, Molly-rino. In fact, we added your HQ to our travel itinerary so we could help out with this very episode.

CANINE: We sensed through the cosmic vibration that you were doing an episode on teeth.

INCISOR: Actually, Marc emailed us. He's a loyal reader, turns out. Oh, such a sweetie.

MOLLY BLOOM: Well, um, then come on in, I guess. Can I get you anything?

[DOOR CLOSSES]

CANINE: We're good. But thanks.

MOLLY BLOOM: You sure?

INCISOR: Oh, yeah. Well, actually, a toothbrush would be great.

MOLAR: We've been on the road for weeks.

CANINE: Yeah, and we're getting kind of ripe. [SNIFFS] Maybe a dip in your mouthwash pool, too? You have one, right?

WISDOM: To floss or not to floss. There is no question. We need to floss.

INCISOR: By the way, what's the Wi-Fi sitch here?

CANINE: I'm just going to set up my yoga mat and do some stretches.

INCISOR: I'd love to log on and, you know, check my email.

MOLAR: I'm starving! You guys got any snacks up in here? Like some chips I could crunch on?

MOLLY BLOOM: Oy vey. It's going to be one of those episodes, isn't it?

[MUSIC PLAYING]

You're listening to *Brains On* from American Public Media. I'm Molly Bloom. And my co-host today is Abby from Mechanicsville, Virginia. Hi, Abby.

ABBY: Hey, Molly. Thanks for having me on the show. I'm so excited.

MOLLY BLOOM: We are so excited that you're here. And joining us for some reason--

[TEETH CHATTERING]

--it's a bunch of teeth.

CANINE: Hi.

INCISOR: So happy to be here!

[TAPPING]

MOLAR: Is this thing on?

WISDOM: The tooth is the window to the mouth.

MOLLY BLOOM: Today we're looking at a phenomenon that happens to all of us-- losing our baby teeth and getting new ones. So Abby, how many teeth have you lost?

ABBY: All of them. All of my baby teeth are gone, and the adult teeth are in.

MOLLY BLOOM: So do you remember what it was like when you lost your very first one?

ABBY: I actually don't. It was so long ago. We were in our old house in Portsmouth, Virginia.

MOLLY BLOOM: So you wanted to know why we have two sets of teeth. And what made you curious about this?

ABBY: Well, it seemed like my little sister was losing about three teeth a week. And I hadn't gotten to ask my Aunt Amy, who's a dentist in the Air Force, currently serving in Okinawa, Japan. So I decided to ask *Brains On* instead.

MOLLY BLOOM: Well, I appreciate that we can step in for your aunt. I'm sure she would have a really good answer, too. So how old is your sister?

ABBY: She's 10 now. She turned 10 in March of this year.

MOLLY BLOOM: So she's still losing them? Or this was a little while ago?

ABBY: I think she's still losing them. But it was last year when she was losing all of them, like, left and right.

MOLLY BLOOM: So did she have that moment where there were big gaps?

ABBY: Yeah. I mean, they were all around her mouth. It was kind of like, oh, look there's a gap there and there and there and there.

[LAUGHTER]

MOLLY BLOOM: Yeah, do you remember? Do you have those moments where you had maybe your two front teeth missing or any-
- do you remember what that felt like?

ABBY: That's funny. I was just about to say that. Have you ever seen *How to Train Your Dragon*?

MOLLY BLOOM: I haven't.

ABBY: Well, there's this dragon there called Toothless. And he can retract his teeth.

MOLLY BLOOM: Oh!

ABBY: So my nickname was Toothless for a while because my two front teeth were missing.

MOLLY BLOOM: [LAUGHS]

ABBY: I lost them about one day apart. It was crazy.

MOLLY BLOOM: Oh, that's really funny. So do you remember what that felt like?

ABBY: It was really weird because every time I drank water, it just went right through.

MOLLY BLOOM: [laughs]

(SINGING) Ba ba ba ba ba ba ba ba ba ba ba, Brains On.

MOLLY BLOOM: Before we get into the why of why we have two sets of teeth, let's look at how. Our pal, Kunsang Dorjee, is here to explain.

KUNSANG DORJEE: Hey, Molly. Hey, Abby. (HESITANTLY) Hey, group of anthropomorphic teeth.

MOLLY BLOOM: Just go with it.

KUNSANG Sure. Well, growing teeth is something that we all do, but rarely do we stop and appreciate its awesomeness.

DORJEE: Think about it. Solid white things literally break through the tissue on your jaws. And then you can use those white things to tear, mash, rip, and gnash all kinds of things. They're like tools growing out of your face.

ABBY: I guess it is pretty amazing.

KUNSANG Yeah, and it all starts before you're even born.

DORJEE:

[MUSIC PLAYING]

While you're still a baby in a belly, the first bits of your baby teeth start forming in your jaw. And a little later, your adult teeth also start to form directly beneath the roots of the baby teeth.

MOLLY BLOOM: That's a lot of teeth for a tiny head.

KUNSANG Now, the real fun starts after we're born. That is, if you enjoy having hard little teeth poke through your gums.

DORJEE:

[BABY CRYING]

For almost all children, your baby teeth start coming when you're around six to 12 months old. And usually the first ones are the incisors.

INCISOR: Hey, that's me! I'm an incisor.

KUNSANG Why don't you tell us about yourself?

DORJEE:

[UPBEAT MUSIC]

INCISOR: Well, I'm a Libra. And I enjoy mystery novels. And my favorite pudding is chocolate.

KUNSANG I mean, tell us about what an incisor tooth is for.

DORJEE:

INCISOR: Oh. [GIGGLES] Right. All you got to know is that I lead the pack and help you cut through food. That's why I'm thin, like a knife or scissors edge.

[KNIFE BLADE CLANGS]

Us incisors, we are the teeth front and center in your mouth, with two on top and two on the bottom.

KUNSANG OK, what about the non-central ones? You know, the ones right next to you, here and here.

DORJEE:

INCISOR: Oh, yeah! Those are the lateral incisors. They come in right after us and sit right beside the central ones. They're also in the cutting business.

KUNSANG Very nice. So after the incisors, we also get our molar and canine teeth.

DORJEE:

[SMOOTH MUSIC]

CANINE: Thank you for the kind introduction. I am indeed a canine tooth. We're the pointiest and help you tear through food. I look like the tip of a spear, right?

KUNSANG

DORJEE: Oh, yes. Looking sharp.

CANINE: Thank you.

KUNSANG

DORJEE: When do you guys come in?

CANINE: Well, we sit right next to the lateral incisors. But timing-wise, we usually come in after the first molars do, but before the second.

MOLAR: Did someone say molars?

CANINE: Yeah, me. I literally just said that.

[LUAU MUSIC]

MOLAR: Hola, everyone. Molar's my name. Crushing food is my game. We're the biggest and the toughest teeth. And we help you grind your food while you chew.

We're all the way in the back of your mouth. Come by and say hi any time. We're always having really chill kickbacks.

KUNSANG

DORJEE: (MUFFLED) Oh, like back here?

MOLAR: Yup, that's your molar.

KUNSANG

DORJEE: So for a full set of baby teeth, I count 1, 2, 3, 4, 5, 6, 7, 8, 9-- 10 on top and 10 on the bottom. And all those teeth should come in by the time you're three years old. But don't worry if they don't come in that exact order. Sometimes it'll change depending on the child.

ABBY: That's good to know. So what about our adult teeth?

KUNSANG

DORJEE: Right. While the baby teeth come in, the adult teeth are still growing beneath the gums. Imagine it this way.

[CAMERA SHUTTER CLICKS]

If you took an X-ray of your jaw while you had all your baby teeth, you'd see two sets of teeth, one above the other. And by age six, the adult teeth start to nudge the roots of the baby teeth until they get loose and fall out, giving the adults space to rise and grind.

MOLAR: Did someone say grind?

CANINE: Yes, he just said that. Are you even listening to him?

MOLAR: Just want to let you know, your first adult teeth are usually us molars. We grow right behind the baby ones, where there are no teeth, so we don't replace anything.

KUNSANG
DORJEE: That's right. And after that, the adult teeth pretty much come in the same order as the baby teeth. By age 12, all baby teeth have typically fallen out, and the second adult molars begin to come in behind the first ones. For some people, this is the end of their teeth-growing journey. But for others, they have one more set of molars slated to come in around the start of adulthood.

[GENTLE MUSIC]

WISDOM: Hello, it is I, the third molar. Some people know me as the wisdom tooth. We complete the full set of 32 adult teeth. Some people have to get us pulled out because they don't have room for us or because we upset the balance of the other teeth. But we're OK with that because true wisdom comes from experience, not from the back of your mouth.

KUNSANG
DORJEE: Well, on that note, that's all the wisdom I have for you today. Got to run. I have an appointment at "tooth-hurty."

MOLLY BLOOM: Thanks, Kunsang.

ABBY: Yeah, thanks for the awesome information. Bye!

[FUNKY MUSIC] Brains on, on, on.

MOLLY BLOOM: So Abby, let's get back to your question about teeth, why we have two sets.

ABBY: Right. To find the answer, I had a video chat earlier with Peter Ungar. He's a professor at the University of Arkansas, and he wrote a book called *Evolution's Bite-- A Story of Teeth, Diet, and Human Origins*. Thanks for joining us, Peter.

PETER UNGAR: Thanks for having me, Abby.

ABBY: So why do we have two sets of teeth? Why not one or four or never-ending sets of teeth?

PETER UNGAR: Well, we've got two sets of teeth because our jaws grow until we become adults. And our teeth-- they don't grow. They don't change in their size. They start out pretty small, like we are. And then, as our jaw grows, we've got to put new teeth in, so they fill our mouths.

If you are, say, a fish or a reptile, you continue to make new teeth throughout your lifetime because your jaws keep growing. They don't stop when you become an adult. If you're a mammal, however, you stop growing your jaw when you reach adulthood. And it's important not to have too many generations of teeth-- adult and then teeth that come in after that and after that-- because the upper teeth and the lower teeth have to come together in a really specific and precise way in order to allow you to chew.

Reptiles and fish-- they don't chew. But mammals, including humans, do chew. And the relationship between the upper and lower teeth has to be really precise. So if you keep replacing your teeth, that's very difficult to do.

MOLLY BLOOM: Wow.

PETER UNGAR: Yeah.

ABBY: So how long have teeth been around?

PETER UNGAR: Teeth have been around for hundreds of millions of years. And they've been around since the earliest fish with jaws.

ABBY: That's a really long time.

PETER UNGAR: Yeah, it's largely because the fossil record-- teeth are like rocks. They preserve, and they last forever.

ABBY: Why do so many animals have teeth?

PETER UNGAR: Teeth are important because they help you break down food. Once you eat food, it goes into your stomach. And you can then take advantage of the nutrients in those food. You can break them down, and you can use them for energy. And teeth start the process of breaking down that food. And it gives you an advantage over animals that don't have teeth.

ABBY: Wow. That's awesome. So, Peter, what's your favorite set of teeth?

PETER UNGAR: I think my favorite tooth is the tooth of a narwhal. The narwhal is also called the unicorn whale. And it has an incisor tooth that looks like a unicorn's horn. It is maybe six feet long. And it spirals just like a unicorn's horn. And it has, inside the tooth, millions of nerve endings for detecting the chemistry of the ocean water. Fascinating tooth.

ABBY: Wow. So how have our teeth changed over time?

PETER UNGAR: Our teeth have changed over time in two ways. Teeth have gotten stronger. The hard cap on the outside of your teeth, called enamel, has become more complicated. And the chemistry has changed. And the way that they form, the structure, has changed.

And our teeth have gone from very generalized to things that are specialized and are very good at doing one or two things. Like for example, they're good at crushing. Or they're good at slicing.

ABBY: Wow, I didn't even know teeth could change.

PETER UNGAR: Mm-hmm. That's evolution.

ABBY: So in your book, *Evolution's Bite*, you mentioned foodprints. Care to tell us what those are?

PETER UNGAR: Foodprints are scratches and pits that food has left in the teeth. And paleontologists spend an awful lot of time trying to figure out the best way to interpret those foodprints.

ABBY: That's amazing. I had no clue we could tell that much just through our teeth.

PETER UNGAR: Absolutely. You can actually tell a lot more than just diet. You can tell something about the development of an animal, how old it was when it became an adult. You can tell whether it grew quickly or slowly. You can tell who an animal, in the past, was related to.

Teeth are really good tools. And in many cases, they're the only tools that we have to try and understand animals in the past, because they're the only thing that preserves in the fossil record because they're so hard and strong.

ABBY: Thank you for joining us on the show, Peter. Thank you so much for answering my questions.

PETER UNGAR: Thank you so much for inviting me to speak to you.

[ELECTRONIC MUSIC] Brains, brains, brains on.

MOLLY BLOOM: OK, Abby. Here's something for your ears to chew on. It's the--

[ELECTRONIC SOUNDS]

CHILD 2: (WHISPERING) Mystery sound.

MOLLY BLOOM: Here it is.

[RHYTHMIC CLICKING]

All right, what is your guess?

ABBY: Um, it sounds like either a pen clicking or somebody on a pogo stick.

MOLLY BLOOM: [LAUGHS] I like both those guesses. Very good.

ABBY: They're two very different answers, too.

MOLLY BLOOM: But like a repetitive motion, an up-and-down motion. I get it. We'll have the answer in just a bit. So stick around.

[MUSIC PLAYING]

After this episode, we're taking a short break from posting new episodes. But guess what starts next week? That's right-- Smash Boom Best, our debate show where we take two things, smash them together, and as you to decide which one is best. Our first debate back is fairies versus giants. Yeah, it's going to be a very, very good one. So go subscribe wherever you listen to this podcast so you don't miss it.

MAN: (SINGING) It's Smash Boom Best. It's Smash Boom Best.

[UPBEAT MUSIC]

MOLLY BLOOM: *Brains On* will be back the first Tuesday in September with all-new episodes. And one of the episodes we're working on is all about garbage. So we have a question for you. What's a creative way you reuse something that might otherwise end up in the trash? Maybe something you do with toilet paper tubes, plastic wrap, old socks. Let us know. Abby, what is something that you reuse in a creative way?

ABBY: Well, we have a garden in our backyard. And we use the seeds from squash we grow in that garden and replant them in the garden the following year. And we compost scraps we can't eat or don't eat.

MOLLY BLOOM: Oh, that is great. So the garden is a really good place to recycle organic stuff like food and seeds?

ABBY: Yes, and whatever we compost goes right back into the garden once it's done fully composting.

MOLLY BLOOM: That is wonderful. Well, listeners, we want to hear your ideas, too.

ABBY: Send us a short recording at BrainsOn.org/contact.

MOLLY BLOOM: Besides your favorite reuse idea, we'd love if you sent us a question or a drawing or a mystery sound. Just head to BrainsOn.org/contact.

ABBY: That's where we got this question.

HARRIS: Hi, my name is Harris from Detroit. My question is, why do bees make a buzzing sound?

MOLLY BLOOM: We'll answer that at the end of the show, during the Moment of Um. And we'll read the latest group of listeners to join the Brain's Honor Roll.

ABBY: So keep listening.

You're listening to *Brains On* from American Public Media. I'm Abby.

MOLLY BLOOM: And I'm Molly. And this is the mystery sound again.

[RHYTHMIC CLICKING]

All right. So last time you were hearing pen clicking, pogo sticking. What are your new thoughts?

ABBY: Um, I'm leaning toward pen clicking now.

MOLLY BLOOM: OK.

ABBY: Yeah, I'm going to stick with pen clicking. Lock it in.

MOLLY BLOOM: Lock it in. [LAUGHS]

ABBY: I watch too many game shows.

MOLLY BLOOM: [LAUGHS] There's no such thing. All right, here is the answer.

LAUREN: Hi, my name is Lauren, from Westland, Oregon. And that sound you just heard was my wiggly tooth. I pulled that tooth out not long after I recorded this because I didn't want to lose it while swimming.

MOLLY BLOOM: So, a wiggly tooth.

ABBY: I-- I don't know what to say.

MOLLY BLOOM: [LAUGHS]

ABBY: That sounds nothing like a wiggly tooth.

MOLLY BLOOM: We should hear it-- let's hear it again and see if you can picture that now that we know what it is.

[RHYTHMIC CLICKING]

So what do you think, now that you know?

ABBY: Oh, gosh, I can hear it. But I don't want to. The picture in my head is-- no, I don't like that.

MOLLY BLOOM: [LAUGHS] Yeah, it's a little-- um, little icky. Little ickiness there. But it's something we've all been through. We've had that wiggly tooth. Play with it when you're bored, I guess.

ABBY: I had one tooth fall out. And I'll never forget this. I was playing tug of war with my neighbor. And she let go. And I was holding on with all my might. And my fist came back and slammed into my mouth. And one of my teeth was just hanging from the gum. It was so bad. I was like, no, don't touch it! It's going to hurt!

MOLLY BLOOM: Oh, my goodness.

ABBY: It just fell out on its own. And I was like, oh, OK.

MOLLY BLOOM: [LAUGHS] Yeah, losing teeth is something that all of us do. But it's kind of mysterious. One day they're strong and fine. And then, wiggle-city.

[TEETH CHATTERING]

INCISOR: Hey! Molly! Hi! Want us to explain it? We can explain it. Do you want us to? We can definitely do it!

ABBY: I feel like you're going to do it no matter what we say.

MOLAR: Oh, we totally are, brah.

[RHYTHMIC MUSIC]

INCISOR: So you know how, when you're a kid, you have both your baby teeth in your mouth and your grown-up teeth hiding up there in your jaw?

ABBY: Yup, I remember hearing that.

CANINE: Well, like the oak tree has roots underground, your baby teeth have roots inside your gums. You just can't see them.

WISDOM: The truth will set you free. But the root will keep your tooth in place.

INCISOR: That's right. Roots anchor us teeth in the gums. For a while, there's enough room in your jaw for your baby teeth roots and those hidden adult teeth because those adult teeth are still small. Cozy, right?

MOLAR: But eventually the root of your baby tooth will start to break down.

[WIND BLOWING]

WISDOM: Much like the mighty mountain will one day tumble, and all of human creations will turn to dust.

MOLAR: Yeah. So the upside is that the breakdown of the root makes more room for your adult tooth to grow. Reach your full potential, chompy adult tooth pals! The downside is that, without as much root, your baby tooth isn't held as tightly in your jaw.

INCISOR: And that's where we get that wiggle from. Less root equals more wiggle.

[BOUNCY MUSIC]

CANINE: Sometimes a wiggly tooth can hurt, or even bleed, because your gums aren't used to having moving parts. But that's OK. Putting ice on your gum near a wiggly tooth can help soothe the discomfort.

MOLAR: So it just means your baby tooth is on its way out, and your permanent tooth is moving in. It's pushing on that baby tooth. Shove, shove dude. Eventually, that root just can't hold on anymore.

INCISOR: And we fall out. It's really fun, actually. A little weird at first, but then you can see things outside of the mouth. And that's so cool.

WISDOM: But we are not lost teeth, because it's when all is lost that you find your true self.

ABBY: Wow, teeth. Thanks for explaining all that.

MOLAR: Of course, dude! Any time.

CANINE: This has been fun.

INCISOR: No problemo.

WISDOM: Until next time. (SINGING) Brains On! [CLEARS THROAT]

MOLLY BLOOM: So Abby, when you lost your teeth, what did you do with them?

ABBY: I put them under my pillow for some money from the tooth fairy. Cha-ching!

MOLLY BLOOM: [LAUGHS] Well, we asked our listeners, if they took over the job of tooth fairy, what would they leave in exchange for those baby teeth? And here's what they had to say.

[LIGHTHEARTED MUSIC]

EMMETT: I think that the tooth fairy should put a teddy bear with a toothbrush under the kid's pillow.

KAI: And I think the tooth fairy should leave candy and toys because I think they will be fun.

AIDEN: If I was a tooth fairy, I'll give chocolate chips cookie.

EMILY: My idea for what the tooth fairy should give you-- a new book or a plate of brownies.

ABBIE: I would give them a video game because I love video games.

TAYLOR: I would give a kid a veggie seed, some soil, and a pot if I were a tooth fairy. So that way, the new tooth would be strong and healthy.

MOLLY BLOOM: Wow, I would definitely love to find some of these treats under my pillow. Thanks to Emmett, Kai, Aiden, Emily, Abbie, and Taylor for those brilliant ideas.

ABBY: Around the world, there are so many different traditions related to losing teeth. I found a hotline you can call to find out more.

[PHONE RINGS]

HOTLINE Hello. You have reached the Tooth Trip Hotline, your guide for sending your baby tooth off in style. Para espanol, **OPERATOR:** o prima numero uno. For tips on how to make a wiggly tooth fall out faster, please press 2. For questions about what to do if you've lost your baby tooth-- I mean, like if you really can't find it-- please press 3. To be connected with one of our knowledgeable tooth travel agents, please press 0 or remain on the line.

[FUNKY MUSIC] Throw your tooth on the roof. Get it way up there. Wind up and let it go.

TRISH: Hello, I'm Trish, here to help you handle the tooth. How can I be of assistance today?

ABBY: Well, I just lost a tooth.

TRISH: By gum, congrats.

ABBY: Thanks. And I'm just wondering what my options are here.

TRISH: Oh, well, I'm happy to help you chew it over. Do you have any initial thoughts?

ABBY: It's raining right now, so I'm thinking maybe something indoors.

TRISH: OK, great. One place to start is by putting it under your pillow. But then you have some choices from there. Countries like Denmark and England, a fairy will come and fetch that tooth and leave you a little something. In lots of Spanish-speaking countries and in France, a mouse will do the same thing. You could also leave your tooth in your slippers or in a glass of water.

ABBY: So many options!

TRISH: I know. So many different philosophies about handling lost teeth. If you'd like to try our most popular option, you can go outside and throw it. This is a big hit around the globe-- Singapore, Korea, India, Moldova, Greece, Botswana, and the Dominican Republic, to name just a few.

There are also cute little rhymes you could say to go along with the toss, a super fun option. Another variation is you can throw that tooth at the sun. That's a popular method in Egypt and Oman, for example.

ABBY: Throwing does sound fun. I don't know if I can reach the sun though.

TRISH: I forgot to ask. Is this an upper or a lower tooth?

ABBY: Um, lower.

TRISH: OK, gotcha. Some traditions vary, depending on if it's an upper or a lower. Some people do this in China and Japan and Thailand and other countries. Lower teeth you throw up on the roofs. The tooth will grow up. And uppers get put under the bed or buried. So that will grow straight down. Clever, right?

ABBY: Ooh, yes. I do want my teeth to come in nice and straight.

TRISH: There are also options to feed the tooth to a dog, like some Yupik people in Alaska do, or to a mouse, like some in Kyrgyzstan do, so your teeth will come in strong like theirs. Or plant it, or put it in a tree, so your new tooth will grow strong like a tree.

ABBY: Oh, man. This is a hard decision.

TRISH: We want to make sure your little tooth has a happy journey.

ABBY: Well, in that case, I'd better have a chat with my tooth and see what they think. Thanks for your help.

TRISH: Happy to help. Good luck.

[FUNKY MUSIC]

(SINGING) Throw your tooth on the roof. Get it way up there. Wind up and let it go.

MOLLY BLOOM: OK. So far, we've learned all about human teeth. But based on those tooth traditions, lots of humans admire the strength of our animal friends' chompers. They've got some miraculous molars. So Abby, are you up for a little game of terrific animal tooth trivia?

ABBY: I sure am. Let's play!

[GAME SHOW MUSIC] Tooth, tooth, tooth. False, false, false. Tooth, tooth, tooth. False, false, false.

MOLLY BLOOM: I'll give you a fabulous fun fact, and you'll have to guess if it's tooth or false. Are you ready to play?

ABBY: Yes, I'm so excited.

MOLLY BLOOM: All right. Tooth or false? Hippopotamus teeth are the strongest natural material on Earth.

ABBY: Ooh. I'm going to say that's false.

[BELLS RINGING]

MOLLY BLOOM: You are correct. It is false. Although hippos have tremendous chompers, it's actually limpet snails who have the strongest teeth. These snails have thousands of tiny teeth called radula that they use to grind down food. Researchers found that these teeth were about five times stronger than spider silk. Now that's one strapping snail. What do you think about that, Abby?

ABBY: That's amazing. I've seen videos on, I think it's *Mythbusters*, where they take spider silk and they tie it to steel or something. And the spider silk holds it up. It's so cool.

MOLLY BLOOM: That is amazing. I guess they should try snail teeth next.

All right, on to the next. Tooth or false? Naked mole rats use their teeth to dig holes.

ABBY: Um, we actually-- in class, we watched a camera of a bunch of naked mole rats. I'm going to say that that is a tooth.

[BELLS RINGING]

MOLLY BLOOM: Yes, it is true! It is a tooth. Their lips close behind their front teeth so they don't eat any dirt while they burrow. But that's not all. Naked mole rats can also move their front teeth independently from one another, just like a pair of chopsticks.

ABBY: That's weird. That's about as mind-blowing as people moving their ears.

MOLLY BLOOM: [LAUGHS] Yeah. It's incredible.

ABBY: I mean, that's immediately what I thought of when you said they can move them. I was like, how can you do that?

MOLLY BLOOM: Yeah, it's incredible. Tooth or false? Sharks only have one set of teeth.

ABBY: That is tooth. I know that for a fact. That its tooth.

MOLLY BLOOM: Actually, it's false.

ABBY: Really?

MOLLY BLOOM: Most sharks have between five and 15 rows of teeth. And unlike humans, shark teeth aren't rooted. So they fall out easily, meaning they're constantly losing teeth. But luckily they're also constantly being replaced, like a conveyor belt of pearly whites.

ABBY: That's weird.

MOLLY BLOOM: Yeah, isn't that?

ABBY: The things you don't learn from Shark Week.

[LAUGHTER]

MOLLY BLOOM: All right, we've reached our final fact. Abby, tooth or false? You can tell a dolphin's age by its teeth.

ABBY: Um, I'm going to say (HESITANTLY) tooth.

[BELLS RINGING]

MOLLY BLOOM: You are correct. Dolphins only have one set of teeth their entire life. And these teeth form distinct layers each year. So just like counting tree rings, scientists can count these layers to calculate a dolphin's age.

ABBY: Ooh, I got to thank Mr. Ungar for that. He taught me about foodprints. It's really cool.

MOLLY BLOOM: That is really cool. I didn't know our teeth told such a story. That's awesome.

ABBY: Me, neither. I was mind blown.

MOLLY BLOOM: Well, excellent work, Abby. Who knew animal teeth were so incredible? Thanks for playing Tooth or False.

ABBY: It was so much fun.

[GAME SHOW MUSIC] Tooth, tooth, tooth. False, false, false.

CANINE: Well, Molly and Abby, this has been fun. But we got to get moving on.

MOLLY BLOOM: Oh, are you sure?

INCISOR: Yeah, we got to get going. We're meeting up with some fingernail cuttings for a bite-- you know, a former body part brunch.

ABBY: Well, thanks for helping out. Nice to meet you.

MOLAR: For sure. Well, it's been real. Catch you next time, *Brains On* peeps.

ABBY: Bye!

MOLAR: We'll be listening for you.

WISDOM: Parting is such sweet sorrow. And so is getting a parking ticket. I hope our meter isn't expired!

ABBY: We start growing our teeth before we're born.

MOLLY BLOOM: Baby teeth help you eat when you're little.

ABBY: They also hold space for adult teeth to come in later.

MOLLY BLOOM: When a baby tooth roots start to break down, it gets wiggly.

ABBY: That leaves more space for a permanent tooth to grow in.

MOLLY BLOOM: That's it for this episode of *Brains On*.

ABBY: *Brains On* is produced by Marc Sanchez, Menaka Wilhelm, Sanden Totten, and Molly Bloom.

MOLLY BLOOM: We had production help from Ruby Guthrie and Kristina Lopez. And our intern is Kunsang Dorjee. We had engineering help from Sean Evans and Veronica Rodriguez. Special thanks to Scott Jernigan, Rosie DuPont, Coco Sanchez, Jed Kim, and Beth Perlman.

ABBY: Now, before we go, it's time for our Moment of Um.

[MANY VOICES REPEATING "UM"]

HARRIS: My question is, why do bees make a buzzing sound?

ELINA NINO: Bees actually buzz usually when they fly. We can perceive their flight as buzzing. They will beat their wings really fast, so up to about 200 to 230 beats per second. Thereby, they're moving air. And then we perceive that air movement and air vibration as buzzing sounds.

Hello, my name is Elena Niño. And I'm a bee scientist. Bees buzz also in their colonies, for example, to communicate. So in that instance, I work particularly with honeybees. So they use buzzing to communicate to each other what their needs are.

So for example, they will communicate to each other that they have plenty of nectar in the colony, for example. And they are going to tell each other, OK, so now you don't have to recruit any more foragers to go out for nectar because we have plenty.

And the way they do buzz in the colony is slightly different. They don't actually fly, obviously, inside the colony. So what they do, they will put their wings behind, and they just contract their thoracic muscles really quickly. And thorax is just the middle segment of the honeybee. So they will contract their muscles really fast. And that will create, essentially, vibrations that the other bees can perceive.

The third reason that bees usually use buzzing for, or essentially these rapid movements of their muscles, is for buzz pollination. And honeybees actually can't do that. Bumblebees are really good at performing buzz pollination.

For example, if you have a tomato plant, the pollen is not easily accessible in the male part of the plant. So it's not just accessible by touching to the anther of the plant. And what a bumblebee will do, they will fly to the anther of the plant. They will grab onto it. And again, they will essentially really quickly vibrate or contract their thoracic muscles, thereby vibrating the anther. And then the pollen just pops out in a large burst. And it essentially showers them with pollen. And then they can take the pollen to the next plant and fertilize.

MOLLY BLOOM: This list of names is bee-autiful. It's the Brain's Honor Roll. These are the incredible kids who keep us going with their questions, ideas, mystery sounds, drawings, and high fives.

[LISTING HONOR ROLL]

[THEME MUSIC]

Brains On will be back soon with more answers to your questions.

ABBY: Thanks for listening.