

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

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

NARRATOR: For millions of years, humans have used tools. And for over 10,000 years, people have spoken in unique languages.

WOMAN 1: Hola.

WOMAN 2: Marhaban.

WOMAN 3: Ni hao.

WOMAN 4: Bonjour.

NARRATOR: But now, in just the last 5,000 years, humans have come up with two new activities--

[WRITING]

--writing--

[PAPER FLIPPING]

--and reading. The first writing came from ancient Sumer where Iraq is today.

WOMAN 5: We can record history, write poetry, keep receipts.

NARRATOR: Ancient societies wrote pictures and symbols on wood, papyrus, stone, even bone.

WOMAN 6: This says you sold him a cow with beautiful hooves. You paid how much?

NARRATOR: In most ancient communities, only some people could read.

WOMAN 7: Can you say that aloud to me instead?

NARRATOR: But in the last few centuries, reading has boomed.

WOMAN 8: Inventing paper and printing helped.

NARRATOR: There have been some funny ideas along the way.

WOMAN 9: Ha! Reading in bed is evil! Don't do it.

NARRATOR: But today, more humans can read than ever before. Most amazing of all, absolutely no one is born knowing how to read. We all had to learn.

WOMAN 10: And that doesn't mean it's always easy.

NARRATOR: So coming soon to a sound system near you, a *Brains On* episode all about how and why different people learn to read in different ways. Stay tuned.

[THEME MUSIC]

MOLLY BLOOM: You're listening to *Brains On* from American Public Media. I'm Molly Bloom. And today my co-host is Izzy from Baltimore, Maryland. Hi, Izzy.

IZZY: Hi, Molly.

MOLLY BLOOM: And Izzy, today's episode was inspired by a question that you sent to us. Do you remember what you wrote to us about?

IZZY: Yes, I do. I wrote about dyslexia.

MOLLY BLOOM: And what made you curious about dyslexia?

IZZY: What made me curious is because I have dyslexia, so I wanted to know a little bit more about what happens and what goes on in your brain.

MOLLY BLOOM: It's a really good question. So yeah, dyslexia is pretty common. It's estimated that 10% to 20% of people have it, meaning that if you have 20 people in a room, a couple of them will have dyslexia. But what exactly is it? Izzy, how do you describe what dyslexia is?

IZZY: Well, I describe dyslexia as where your brain has a bit of trouble reading and writing.

MOLLY BLOOM: Yeah, it's the word that we use to describe when people have a hard time learning how to read and writing, like you said. And the reason that it's so common is because reading is a relatively new thing that humans can do.

IZZY: Our brains did not evolve to do this naturally. We have to learn to do it.

MOLLY BLOOM: So Izzy, can you think of things that babies and toddlers just figure out how to do on their own?

IZZY: They learn how to cry, swallow, whine.

MOLLY BLOOM: [CHUCKLES] Yeah. Talk, right?

IZZY: Yeah.

MOLLY BLOOM: Yeah, I mean, because they don't-- like if you think about a toddler, one day they're going like, ba, ba, ba, ba, ba. And then the next day, all of a sudden, they're like, water or ball. And then all of a sudden they're like, I want the ball. Like no one-- they listen to us, but no one had to sit down and teach them how to do that.

IZZY: Yeah. Mm-hmm.

MOLLY BLOOM: But reading is different. As we heard in the intro to the show, there were generations and generations of humans who never learned to read. It took a long time in history for reading and writing to catch on.

IZZY: And humans are the only animal that have figured out how to read. It all starts with the letters.

MOLLY BLOOM: Those squiggly lines that we've all agreed mean something. Now imagine we've picked a few of those letters to spell a word on the page.

IZZY: How about water?

MOLLY BLOOM: Sure. So there's a page with the word water printed on it.

IZZY: W-A-T-E-R.

MOLLY BLOOM: How do our eyes take the information from those squiggles and send it to our brains? And how do our brains figure out what it says and what it means?

IZZY: It's complicated.

MOLLY BLOOM: Yes. When we learn to read, we're basically using parts of the brain that originally evolved for other purposes. Now, scientists are still doing research to understand how people figure out how to read.

IZZY: Here's what most of them think happens.

RACHEL ROMEO: There's two different routes it can take. If you're a beginning reader, then it's going to take what we call a slow route.

MOLLY BLOOM: Rachel Romeo, a research fellow at MIT and Boston Children's Hospital, agreed to take us on a journey through the brain as it learns how to read.

[MUSIC PLAYING]

RACHEL ROMEO: When you first view a word on a page, the visual parts of your brain are the first parts of the brain that it accesses. So the information goes from your eyes, through your retinas and visual nerves, into the back part of your brain called the occipital lobe, so just the very back of your head.

EYES: Uh, Occipital Lobe, this is the Eyes, do you copy?

OCCIPITAL LOBE: Copy that. Go for occipital lobe. What do you have eyes on, Eyes?

EYES: Just want you to know that we're looking at something here. Yes. We are definitely looking at something.

OCCIPITAL LOBE: 10-4. We are looking at something, not sure what though.

RACHEL ROMEO: And then the information is going to be transferred to a region called the visual word form area. And this is kind of at the bottom of your brain, and this is typically located in your left hemisphere.

OCCIPITAL LOBE: Visual Word Form Area, this is Occipital Lobe. Package incoming. Copy?

VISUAL WORD FORM AREA: [CLEARS THROAT] You mean, Viziwofo.

OCCIPITAL LOBE: Are you really trying to make that nickname stick, Visual Word Form Area?

VISUAL WORD You mean--

FORM AREA:

OCCIPITAL I mean, Viziwofo.

LOBE:

VISUAL WORD Roger that. And it's the best nickname ever.

FORM AREA:

OCCIPITAL [SIGH] Can I just send you this image now?

LOBE:

VISUAL WORD You got it, Occi-Lo.

FORM AREA:

OCCIPITAL Please don't call me that. Here's what we're seeing. Let us know if you can make sense of it. Occi-Lo-- I mean,

LOBE: Occipital Lobe, over and out.

VISUAL WORD Oh, this is a good one. Yes, we are definitely seeing something. And yes, these squiggles mean something. Oh

FORM AREA: man, this is a word! I love words. It's so cool that we're learning to read now.

RACHEL So you might do what we call decoding and break down the word into the individual sounds that each letter

ROMEO: makes. And that's processed in a part of your brain called the temporal lobe. It's also the part of your brain that recognizes speech when other people are speaking.

VISUAL WORD Hey, Tempy-Lo.

FORM AREA:

TEMPORAL What's up, Viziwofo?

LOBE:

VISUAL WORD Got a word here for you.

FORM AREA:

TEMPORAL Rad!

LOBE:

VISUAL WORD I'll send it over so you can do what you do so well-- sound it out.

FORM AREA:

TEMPORAL Oh, OK. W, that makes a wuh sound. Got it. And then A, hmm, hmm. That could be like A like apple or ah. OK.

LOBE: "Wa." Next, T. That's the tuh sound. "Wat." "Wat." All right, all right, all right! E, that's like eh. "Wa," "te." Hmm. And last-- oh. That's an R, baby. That makes an err sound, yo!

We're almost done. "Wah-ter." But that's not really a word, right? Oh, I got it. Water! Pew, pew pew!

RACHEL And then from there, it'll go to the part of the brain that processes meaning. And that's usually in the frontal lobe,

ROMEO: so right around where your temple is.

TEMPORAL Frontal Lobe!

LOBE:

FRONTAL LOBE:What's up, Temporal, old buddy?

TEMPORAL Got a word here for you.

LOBE:

FRONTAL LOBE:Oh, great. Send it my way. Oh! Water. That's the clear, wet stuff. You know, like in the bathtub. Or you can drink it too. It melts wicked witches, puts out fires, and fills up oceans, lakes, and rivers. Water.

RACHEL And so that's what we call the slow route where you have to process the sounds of the words before you can get
ROMEO: to the meaning. Now, if you're an experienced reader, you've been doing it for several years, you can read relatively fluently, then you can kind of skip over that sound processing region in the temporal lobe and have more of a direct path from the word form area directly to meaning.

EYES: Occipital Lobe, incoming from the Eyes.

OCCIPITAL Thanks, Eyes. Viziwofo, incoming.

LOBE:

VISUAL WORD Thanks! Yep, it's a word. Frontal Lobe, you got it?

FORM AREA:

FRONTAL LOBE:No need to sound it out. I remember this one. It's water, the wet, clear stuff.

RACHEL And people with dyslexia, there are a number of different things that may be going on in their brains. They have
ROMEO: all the same parts. It's not like any parts are missing. But sometimes they function a little bit differently.

MOLLY BLOOM: Some people think dyslexia means that words look scrambled or out of order, but that is just a myth. Scientists think that what's really happening is that the brain keeps using the longer path to process words, the one that involves sounding everything out, even with familiar words.

TEMPORAL Oh, OK. W, that makes a wuh sound. Got it. And then A, hmm, hmm. That could be like A like Apple or ah. OK.
LOBE: "Wa."

RACHEL This makes reading slower and harder. Children with dyslexia often spend a little bit longer in that slow route of
ROMEO: reading. And even as adults, individuals with dyslexia may have to frequently rely on that slower route when they encounter new words or unfamiliar words.

MOLLY BLOOM: It's important to point out that even though people with dyslexia have brains that may work a little bit differently than people who are able to learn to read more quickly, it doesn't mean that they're less intelligent. Really, no two people's brains are exactly the same. We all have things that come more naturally to us than others. So Izzy, what stood out to you about Rachel's journey through the brain?

IZZY: She said that everything, like everything, is everywhere.

MOLLY BLOOM: [LAUGHS] So you mean that's because the message moves between all these different parts of the brain?

IZZY: Yeah. Uh-huh. That's what I mean.

MOLLY BLOOM: That is really cool that all these different parts of your brain are involved in doing something that maybe seems like it should be simple, but it's really not. It's really complicated.

IZZY: Yeah.

MOLLY BLOOM: We're going to find out more about what's going on in the brains of people who have dyslexia in just a little bit. But first, it's time for--

SPEAKER 2: (WHISPERS) Mystery sound.

MOLLY BLOOM: --the mystery sound. Here it is.

[MYSTERY SOUND]

What is your guess?

IZZY: It sounds like a bicycle, like a typewriter, like a very loud bicycle or a typewriter.

MOLLY BLOOM: Excellent guesses. So we're going to be back with the answer in just a little bit. We're working on an episode all about spacesuits, and we want to hear from you. You know, spacesuits are those special suits that help astronauts do stuff in the cold, dark void of space. But that got us thinking, what if we could invent cool suits to help us do stuff on Earth? Izzy, what would your super suit do?

IZZY: You know the Batman thing when he shoots the thing, and it pulls him forward?

MOLLY BLOOM: Mm-hmm.

IZZY: I would probably have that or be able to teleport.

MOLLY BLOOM: Oh, those are both really good skills to have.

IZZY: It would also have little holes in it, so I could-- I wouldn't sweat half to death.

MOLLY BLOOM: [LAUGHS] I like that you're very practical.

IZZY: And it would be waterproof and fireproof.

MOLLY BLOOM: The super suit can go anywhere, do anything, and is very breathable. It's perfect.

IZZY: Yes.

MOLLY BLOOM: Well, listeners, you can send your super suit ideas to us at brainson.org/contact. And while you're there, you can also send us ideas, questions, mystery sounds, and drawings. Have we mentioned how much we love your drawings?

IZZY: That's brainson.org/contact.

MOLLY BLOOM: That's where we got this question.

ABIGAIL: Hi, *Brains On*. This is Abigail from Nashville, Tennessee. And my question is, do mice really like cheese? If so, why?

MOLLY BLOOM: We'll be back with the answer to that during our *Moment of Um* at the end of the show. And we'll read the newest group of listeners to be added to the Brains Honor Roll. And if you listen to the very, very end, you'll hear a preview of our newest episode of *Smash Boom Best*.

IZZY: Ice Age versus Jurassic.

MOLLY BLOOM: And the debaters in that episode are our very good friends from the *Story Pirates*, Peter and Lee. Trust me when I say, you won't want to miss it.

IZZY: So keep listening!

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

MOLLY BLOOM: And I'm Molly. We're going to dive right back into the brain.

IZZY: Sounds squishy.

MOLLY BLOOM: [CHUCKLES] And bouncy.

IZZY: In our brains, we have gray matter and white matter.

MOLLY BLOOM: Gray matter is where the processing happens, and white matter makes up the pathways that connect the different parts. And when scientists, like Rachel Romeo, look at people's brains who have trouble reading, they see differences in these pathways.

RACHEL So these are what we consider to be the information highways in the brain that connect regions to each other.

ROMEO: And specifically, one white matter pathway that is particularly important for reading is called the arcuate fasciculus. You have one in both your left half of your brain and your right half of the brain. But the one into left half of the brain is particularly important for reading and language.

MOLLY BLOOM: So this highway in the brain of someone who has dyslexia may not work as efficiently as people who have an easier time learning to read.

RACHEL Which makes a lot of sense if you think about how much of your brain is necessary for reading. You need visual

ROMEO: areas and language areas and areas that understand meaning. And if the connections between those areas maybe aren't as strong, then you can start to imagine how things can start to break down.

MOLLY BLOOM: So for people who don't have dyslexia, when they read, most of that happens in the left half of their brains. But people with dyslexia use both the right and left halves of their brains when reading.

RACHEL And so you can sort of see the analogy between that and maybe having to work a little harder because you're

ROMEO: literally using more of your brain to accomplish the same task.

MOLLY BLOOM: Researchers are still trying to figure out what this all means and why some people's brains work like this and others don't.

RACHEL There's a huge field of study on why certain individuals have dyslexia and why the brain is different. And some of the most interesting research within the last few years has looked at children before they learn to read, so children who are at risk maybe of developing dyslexia because they have family members who have dyslexia, and we do know it runs in families and has somewhat of a genetic component. So if we look at these kids before they start reading, we see that the brain is already wired differently from the get-go.

MOLLY BLOOM: Scientists have found that the earlier kids with dyslexia get extra reading help, the better. It can be good to help them out really early even as they're just learning to read.

IZZY: But that's tricky.

MOLLY BLOOM: How do you figure out if someone might have trouble reading if they haven't learned to read yet? That's my understanding differences in the brain is so important. Izzy, I know you've worked really, really hard on your reading. Can you tell us a little bit about what you've done to work on it?

IZZY: What I've done to work on my dyslexia, I've been tutored, and I have great teachers that have helped me. And I've been reading some books.

MOLLY BLOOM: That's awesome. And do you feel like it's getting easier? Or you feel more--

IZZY: Definitely getting easier. And I feel like I'm getting more confident with my reading.

MOLLY BLOOM: That is great. And when did-- how old were you when you first realized you had dyslexia?

IZZY: Six.

MOLLY BLOOM: You were six? Because you were having trouble learning how to read?

IZZY: Yes. I did not want to read anything. And I spent two days doing testing to see if I had dyslexia.

MOLLY BLOOM: And then it turned out you did.

IZZY: I did!

MOLLY BLOOM: And so that was good that you found that out because then you can start getting help.

IZZY: Yeah!

MOLLY BLOOM: Is there like an exercise or a way that you work on it that you find, like, maybe your favorite one to do?

IZZY: It's probably me reading some of my favorite books.

MOLLY BLOOM: So what kind of books do you like to read?

IZZY: I like reading mangas.

MOLLY BLOOM: Oh. So ones that have pictures and words?

IZZY: Yeah, it's kind of a comic. It's a co-- I like reading comic books, I guess. I find them very interesting and very fun to read.

ROBOTIC *Brains, Brains, Brains On.*

VOICE:

MOLLY BLOOM: Well, Izzy, now it's time to engage the ears. It's time to go back to that mystery sound again. Here it is.

[MYSTERY SOUND]

So I'm guessing it was that bell that made you think bicycle last time?

IZZY: Yeah. But, I mean, I feel like it may be something at a gym because just like that noise. But then I'm like, why would there be a bell in a gym?

MOLLY BLOOM: [LAUGHS] Good question.

IZZY: So I think I may be going with the typewriter.

MOLLY BLOOM: Typewriter.

IZZY: Like a very, very, very noisy typewriter.

MOLLY BLOOM: [LAUGHS] Excellent guess. Here is the answer.

CAMPBELL: Hi. This is Campbell from Redondo Beach, California. The sound you just heard is my dad typing on a typewriter. I like this sound because it is from the past and not many people know it now. My dad was typing a letter to his family. He likes to use the typewriter to write letters to special people. I love the ding at the end of each line.

[DING]

MOLLY BLOOM: Izzy, you got it right! Have you ever used a typewriter?

IZZY: Yes. I've used one at my mother's work and at a restaurant. They had a typewriter. I don't know why.

MOLLY BLOOM: [LAUGHS] That's an odd place for a typewriter.

IZZY: I know. It's kind of like a vintage restaurant.

MOLLY BLOOM: OK, got it. So was it fun to use a typewriter?

IZZY: It's fun, but it's also kind of annoying because of the dinging and having to fix it. And you're like, what do I do? I feel like I'm breaking it.

KIDS: *B-B-B-Brains On!*

MOLLY BLOOM: Now that we've solved the mystery sound, let's talk about how scientists are trying to learn more about dyslexia. Izzy, if you could research something about dyslexia, what would you look into?

IZZY: I would probably research, what goes on in your brain? Like how do they know that you actually have dyslexia?

MOLLY BLOOM: Well, you know, a lot of scientists are looking into those exact areas to learn more right now. And one thing that scientists are trying to understand is what's happening in all the squishy parts of our brain when we think about words.

VISUAL WORD Hey. Hey. Tempy-Lo. I think the researchers can see us.

FORM AREA:

TEMPORAL OMG, Viziwofo! Ack! I'm still in my PJs. Double ack! These are my PJs with the liver and kidneys print. Everyone
LOBE: will know about my love for the other organs. I'll never live this down. Quick! Distract them while I go change.

MOLLY BLOOM: [CLEARS THROAT] Did you hear something?

IZZY: Something about PJs?

MOLLY BLOOM: That's what I thought. But brain parts don't wear pajamas. Anyway, scientists can use machines called MRIs to take pictures of people's brains as they read or say words. We asked Gabrielle Torre to fill us in on these brain scans. She's a neuroscientist who studies dyslexia. Here's how Gabrielle described the MRI machine.

GABRIELLE This giant donut-shaped magnet plays with the molecules that are in our brain.
TORRE:

MOLLY BLOOM: When a person lays in the MRIs machine, in the middle of the donut, there's sort of like the donut hole. Different brain molecules show up as different colors-- gray, white, or black.

GABRIELLE The gray matter of the brain, where your neurons live or your brain cells, shows up as gray. And then the white
TORRE: matter of your brain, we can think of those as the highway lanes of your brain that connect your cells, show up as white. And then there are parts of the brain that look black in these images. And that's where your cerebrospinal fluid, which is this liquid that helps cushion and support your brain, that's how that shows up in the image.

MOLLY BLOOM: So MRIs can take a picture of what your brain looks like. There's another similar machine called an fMRI that can actually take an image of your brain in action. If Gabrielle asks someone to read words or repeat words while they're in the fMRI machine, the machine takes a picture of their whole brain as it works on that.

GABRIELLE There's more blood flow or different response of blood flow to those parts of the brain that we think are active
TORRE: during these tasks. So that's what's showing up.

MOLLY BLOOM: And that blood flow looks different in the pictures. So that's how the MRI starts to show which parts of the brain are working. Amazing, right? Gabrielle says actual MRIs are a little more complicated than what you see on TV.

GABRIELLE Whenever in a TV show, they show you someone's in an fMRI, and they're doing something, and they say, oh,
TORRE: this part of the brain is lighting up. That's not really how it works. It takes a lot of math to get to the point where we can decide what part of the brain was active during anything.

MOLLY BLOOM: But with lots of these scans and lots of math, scientists like Gabrielle could eventually understand more about how our brains process letters and numbers so doctors and teachers can find better ways of helping people with dyslexia.

[MUSIC PLAYING]

Having dyslexia can make reading hard, but that doesn't stop people who have dyslexia. So many people with dyslexia have had very exciting careers in a huge variety of fields.

IZZY: Ann Bancroft is here to talk with us today. She's an Arctic explorer and adventurer. And she also has dyslexia. Welcome, ma'am.

ANN
BANCROFT: Thank you. I'm so glad to be here with you.

IZZY: Why did you want to be an Arctic explorer?

ANN
BANCROFT: Well, when I was your age, at the age of 10, I lived in Minnesota and out in the country. And we had deep, deep snow in the winter, and I started just dreaming about those explorers that went to the top and the bottom of the world. And there were always dog sleds and dogs involved, so that I was an animal-- I am an animal lover, so that certainly helped my dreaming, and I've been thinking about it ever since.

IZZY: That's really cool. Can you tell us about your Arctic exploration?

ANN
BANCROFT: Well, when I was 30 years old, I was lucky enough to actualize my dream by going to the North Pole with 7 guys and 49 dogs. And that was extraordinarily fun and hard and wonderful. And I came back from that. And I put together a team of women, three other women. And we went across Greenland, pulling sleds. And then we went down to the South Pole.

And after that, I still didn't have enough of Antarctica, so this Norwegian woman named Liv and I went for 97 days all the way across Antarctica. And we dragged each a 270-pound sled. And we had millions of kids all over the world following us and asking us questions. And I'm still working with Liv where we call ourselves sister spirits.

MOLLY BLOOM: That's amazing. 97 days pulling all your stuff yourself, that is incredible.

ANN
BANCROFT: And you don't see the penguin until the last day.

MOLLY BLOOM: [LAUGHS] Oh no!

IZZY: I was about to say, how many penguins did you see?

ANN
BANCROFT: Oh, hundreds and hundreds and hundreds, and they're not afraid of you.

IZZY: What?

ANN
BANCROFT: But you don't see them for the whole trip because they're on the edges of Antarctica where the ocean is. And they're not afraid because they don't have any predator. They don't have anybody that really goes after them. So when you sit on the beach quietly, they come right up to you. They waddle right up, and I just love them.

IZZY: What challenges did you have as a result of your dyslexia while exploring?

ANN
BANCROFT: Well, the thing about dyslexia for me is it takes me a long time to read, and I goof up my math problems. And if you want to find the North or the South Pole, you have to do a little bit of math each day to figure out where you are. And if you do it incorrectly, you can get lost. So I would get lost periodically because I would do the math a little bit kooky. And then I'd have to correct it the next day.

So I sometimes don't do things as smoothly as other people, but I have a lot of humor, so I laugh at myself a lot. And then it goes a little easier, and it's kind of fun.

IZZY: Did you have any challenges with your classmates as a result of your dyslexia? And how did you stay positive and not beat yourself up in school?

ANN
BANCROFT: Hmm. Really good question. Yeah, my classmates were kind of OK. I don't think they really understood. And I made friends by being out on the playground and doing things. I was much more physical than I was a good performer in the classroom. And I think school was never a very fun place for me, so it was hard for me to remain positive. But fortunately, I had a teacher too that looked out for me and found ways, creative ways for me to learn.

For instance, I was being tutored all the time, which I hated. And one of my tutors realized that one of the ways she could sort of keep me engaged with learning was to put me on the basketball court and play horse. And as we were goofing around, she would slide in little math problems, and we'd yell them out. So it wasn't the pressure of putting it on a blackboard in front of a whole audience of classroom, friends, and things like that.

In fact, having dyslexia has made me a better polar explorer because it taught me to put my nose to the ground and just do the hard work, which is what you have to do out on the ice every day and that nothing comes easily or quickly. So all my years of school and getting through college and being a teacher, which I very much wanted to do, was because I had such good training being a student with dyslexia.

IZZY: Thanks for talking with us today, Ann.

ANN
BANCROFT: Oh, I loved it, Izzy. Thank you for having me.

[THEME MUSIC]

IZZY: Dyslexia is a common learning disability.

MOLLY BLOOM: It's the word used to describe when people have trouble learning to read.

IZZY: A lot goes on in our brains when we read.

MOLLY BLOOM: And that's because our brains didn't evolve to read. We've patched a system together from parts that develop to do other tasks.

IZZY: The brains of people with dyslexia may work slightly differently than those who don't have dyslexia, but it doesn't mean that we're not smart.

MOLLY BLOOM: There are many scientists working to find out more about what happens in dyslexic brains and what treatments and tools could make learning easier for people with dyslexia. That's it for this episode of *Brains On*.

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

MOLLY BLOOM: Menaka Wilhelm is our F-E-L-L-O-W, and she's the B-E-S-T. We had production help today from Christina Lopez and BD Zhang. And we had engineering help from Bob White, Corey [? Strobel, ?] and John Miller. Many thanks to Brooks [? Ellis, ?] Mike [? Mulcahey, ?] Jeffrey Bissoy, Taka [? Zen, ?] John [? Raby, ?] Sarah Pineda, Stefanie Ritoper, and [INAUDIBLE] [? Wong. ?]

IZZY: *Brains On* is a non-profit public radio podcast.

MOLLY BLOOM: Your support means we can keep making new episodes. Head to brainson.org/donate to support the show and see our cool thank you gifts.

IZZY: Now before we go, it's time for the *Moment of Um*.

[MOMENT OF UM]

ABIGAIL: Hi, *Brains On*. Do mice really like cheese? If so, why?

KATE PRITCHETT-CORNING: In cartoons, we often see a cute mouse being pulled to a wedge of Swiss cheese. Based on my experience and scientific research, cheese really isn't a mouse's favorite food. My name is Dr. Kate Pritchett-Corning, and I'm a veterinarian at Harvard University in Cambridge, Massachusetts. I help scientists here at Harvard take care of their mice.

Mice are granivores, which means that they really prefer grains and seeds to almost any other type of food. So if you want an ideal food to catch a mouse, you would mix up some corn, oats, or wheat with some peanut butter. They prefer these things because they have a lot of fat and protein, and finding a lot of calories, a lot of energy, in the wild isn't always easy.

But why would someone study what mice like to eat? Well, because if you want to catch wild mice to study them, you need to have something in your trap that they want to eat. And sometimes we also need to catch mice because they are being pests and damaging human food, so we need something that attracts them away from our snacks. Finally, we also study what mice like to eat because they don't always make good food choices, just like us. And so we can see how certain types of foods affect things like body fat or development of diabetes or other illnesses. Thanks for letting me answer your question. And keep on being curious.

[MOMENT OF UM]

MOLLY BLOOM: Here's a little something for you to nibble on. It's our way of saying thank you to the kids who fuel the show by sending in questions, mystery sounds, drawings, and ideas. This is the newest group to join the Brains Honor Roll.

[LISTING HONOR ROLL]

[MUSIC PLAYING]

We'll be back soon with more answers to your questions.

IZZY: Thanks for listening!

MOLLY BLOOM: And now, before you go, here's a preview of this week's *Smash Boom Best*. Our pals Peter and Lee, who you might know from the *Story Pirates* podcast, are debating Ice Age versus Jurassic.

WOMAN 11: Micro round. We sent our debaters this challenge in advance. It's called Top of the Hour. Lee and Peter will play local news anchors, and they'll deliver all the breaking news, politics, arts, and culture about their sides. They might even throw in a tear-jerking human interest story-- or dinosaur interest story? We'll see. All right, Lee went first last time. So Peter, you're up. Give us the scoop on the Jurassic.

[MUSIC PLAYING]

PETER MCNERNEY: Hello. I'm Peter McNerney, reporting live from the belly of a beast, literally. That's right. I've been eaten by a dinosaur. But not just any dinosaur, I've been eaten by one of the Jurassic era's greatest carnivorous hunters-- the Allosaurus, a terrifying creature standing 16 feet tall and 43 feet long.

While being devoured by a dinosaur was not what I had planned for today, I'm a professional journalist who would never pass up the opportunity for an inside scoop. And yes, that pun was intentional. I'm standing here with a very old Stegosaurus who was also bested by the beast. Tell us, Stegosaurus, how did you end up eaten?

STEGOSAURUS: Well, I am a very old Stegosaurus and not lively as I once was. Old Allosaurus and I have a long history of friendly fighting. And by friendly, I mean terrifying and ferocious. This time, he finally got me.

PETER MCNERNEY: And may I ask, how did those epic battles go? I couldn't help but notice that unlike the Allosaurus, you don't have dozens of sharp teeth that are serrated at the front and rear edges.

STEGOSAURUS: Boy, yes, that was definitely an advantage for old Al. And you know what's crazy about those teeth? Sometimes they fall out during feeding. But then they get replaced by new teeth. That guy's a regular prehistoric tooth factory. Not fair, right?

PETER MCNERNEY: So how did you last so long against such a mighty foe? Not to be rude, but even though you're the size of a bus, I hear your brain is no bigger than a walnut?

STEGOSAURUS: Eh, that's a common misconception. It's actually more the size and shape of a bent hotdog.

PETER MCNERNEY: [CHUCKLES] Fun!

STEGOSAURUS: But I had my tricks. Have you seen this spiky tail of mine? This thing is no joke.

PETER MCNERNEY: Wow, looks like one of them is broken.

STEGOSAURUS: Yeah. In my prime, I could swing that thing so hard that it could send an Allosaurus to an early extinction, if you know what I mean.

PETER MCNERNEY: [LAUGHS] I sure do. Well, congratulations on an impressive career. And good luck with your, um, retirement here inside the Allosaurus.

STEGOSAURUS: [INAUDIBLE] I've already started a book club with these smaller sauropods that were also eaten.

SAUROPOD: Hi! We're reading *Lost World*.

PETER Well, don't spoil the ending. Reporting live from the proverbial end of the road, I'm Peter McNerney. Please send
MCNERNEY: help.

MOLLY BLOOM: That's Peter McNerney and Lee Overtree from the *Story Pirates* podcast. If you want to find out who wins their *Smash Boom Best* debate, Jurassic versus Ice Age, just subscribe to *Smash Boom Best* wherever you listen to podcasts. And after you listen, why not choose a side for yourself? Head to smashboom.org to cast your vote.