RACHEL LEWIS: You're listening to *Brains On,* where we're serious about being curious. Molly, do you hear that?

MOLLY BLOOM: I don't hear anything.

RACHEL LEWIS: Oh, right. That's probably because I've been doing intensive ear training. Ever since I found out I'd be co-hosting this episode, I wanted to be ready.

MOLLY BLOOM: What kind of your training did you do?

RACHEL LEWIS: Well I started with some light ear jumping jacks.

MOLLY BLOOM: Oh, yeah. I see your ears wiggling ever so slightly.

RACHEL LEWIS: Then, I moved on to sprints. You know, you cover your ears to block all sounds, then you uncover your ears and you listen really intently, like this.

MOLLY BLOOM: Wow, that is some intense listening.

RACHEL LEWIS: Yeah. Then, my favorite-- the fire hose.

MOLLY BLOOM: Fire hose?

RACHEL LEWIS: Yeah, that's when you listen to a bunch of sounds at once and try to identify them, so then when you go back to one sound at a time, it's super easy.

MOLLY BLOOM: I wonder what that sounds like.

[CACOPHONY]

Whoa!

RACHEL LEWIS: Yeah, I told you it's intense.

MOLLY BLOOM: Well, I'm excited to get started.

RACHEL LEWIS: I can tell. Your heart sounds like it's beating super fast.

MOLLY BLOOM: You can hear my heart?

RACHEL LEWIS: Ear training, Molly.

MOLLY BLOOM: All right, well let's get right to it. It's time for the--

RACHEL LEWIS: Mystery sound extravaganza!

[MUSIC PLAYING]

MOLLY BLOOM: You're listening to *Brains On,* from American Public Media. I'm Molly Bloom, and here with me today is nine-year-old Rachel Lewis, from Nashville, Tennessee. Hi, Rachel.

RACHEL LEWIS: Hello.

MOLLY BLOOM: Regular listeners of *Brains On* know all about our mystery sounds. Every episode, we test your ears with some puzzling noise and give you a chance to guess what it is. There are so many great mystery sounds in the world, and many, many of them have been sent to us by our listeners. So many, in fact, that we decided to devote an entire episode to these magical magnificent mellifluous mystery sounds.

Now, Rachel, you sent us a mystery sound about a year ago. Let's hear a snippet of that sound.

[AUDIO PLAYBACK]

[WOBBLING SPRINGY NOISE]

[END PLAYBACK]

Can you tell us the story behind that sound that you sent us?

RACHEL LEWIS: My Slinky broke and I stepped on it. So it started-- and then it started making this really cool sound. And so I attached it to my LEGO helicopter. So that's how I figured out the sound that it was making.

MOLLY BLOOM: So you broke your Slinky, but you noticed that it was making a cool sound?

RACHEL LEWIS: Yes.

MOLLY BLOOM: Well, I love that. I think you took some lemons and made some mystery sound lemonade. And once you decided to record that sound, did you start hearing mystery sounds everywhere?

RACHEL LEWIS: Yes.

MOLLY BLOOM: They are, indeed, everywhere. So let's jump right in and start guessing. If you want to score along at home, we've got 10 mystery sounds coming up. Feel free to pause after each one, talk it over, write down your guesses, and see if you're right. Are you ready, Rachel?

RACHEL LEWIS: Yes.

[QUIRKY MUSICAL STING]

CREW: Mystery sound.

MOLLY BLOOM: Here's your first mystery sound.

[AUDIO PLAYBACK]

[CLATTERING]

[END PLAYBACK]

Any guesses?

RACHEL LEWIS: Um, it sounds like someone's squishing a water bottle or something.

MOLLY BLOOM: Awesome. Let's hear it one more time.

[AUDIO PLAYBACK]

[CLATTERING]

[END PLAYBACK]

Any new guesses come to mind?

RACHEL LEWIS: Um, I don't think so.

MOLLY BLOOM: OK, so you thought it was squishing a water bottle. Here is Drew with the answer.

[AUDIO PLAYBACK]

- That sound was me dumping out a 600-piece puzzle onto my dining room table. I like that sound because I really love to work puzzles. My strategy is to work the border first. Then, I like to look for words and faces on the inside. My largest puzzle so far has been 1,000 pieces. I really like geography puzzles. I'm Drew Tashwick, from Louisville, Kentucky.

[END PLAYBACK]

MOLLY BLOOM: So not quite a water bottle. It was a puzzle. But here's a fun fact. The largest puzzle to ever be solved was over half a million pieces, solved by students in Vietnam. 1,600 students worked on it and it took them 17 hours to complete it. Do you think that sounds fun or boring?

RACHEL LEWIS: Fun.

[LAUGHTER]

MOLLY BLOOM: I like puzzles, too. Speaking of solving things, here is the next sound.

[AUDIO PLAYBACK]

[REPETITIVE PERCUSSIVE SOUND]

[END PLAYBACK]

What do you think that one is?

RACHEL LEWIS: I think someone jump roping.

MOLLY BLOOM: Ooh, I like that guess. Do you want to hear it one more time?

RACHEL LEWIS: Yes.

[AUDIO PLAYBACK]

[REPETITIVE PERCUSSIVE SOUND]

[END PLAYBACK]

MOLLY BLOOM: It's definitely something repetitive. Any other thoughts?

RACHEL LEWIS: I don't think so.

MOLLY BLOOM: Jump rope-- let's see if you're right. This sound was sent to us by Madeline, in Vancouver, Washington, and here she is with the answer.

[AUDIO PLAYBACK]

- That was the sound of my spray bottle for watering plants.

[END PLAYBACK]

MOLLY BLOOM: Ooh, a spray bottle. Close-- it was a repetitive thing but not a jump rope. Madeline uses the spray bottle on the plants in her garden.

MADELINE: The plants that I grow in my garden include blueberries, strawberries, bell peppers, cucumbers, and onions. You need to have water and plenty of sun for the plants to grow. For kids who might want to start a garden, you probably want to find a sunny spot and make sure that you have seeds for your garden.

MOLLY BLOOM: Rachel, have you ever gardened?

RACHEL LEWIS: Yeah.

MOLLY BLOOM: What have you gardened? What have you grown?

RACHEL LEWIS: Mostly flowers.

MOLLY BLOOM: And have you ever used a spray bottle to water the flowers?

RACHEL LEWIS: No.

MOLLY BLOOM: That's probably why it was a tricky sound. And Rachel, can you remind people how you sent us your mystery sound?

RACHEL LEWIS: On a phone.

MOLLY BLOOM: And then your mom emailed it to us?

RACHEL LEWIS: Yes.

MOLLY BLOOM: Excellent. Well, if anyone else has a good mystery sound for us, you can also email it to us at hello@brainson.org.

RACHEL LEWIS: It's not that hard.

MOLLY BLOOM: Back to something that might be a little more difficult, this next mystery sound is a toughie. Here it is.

[AUDIO PLAYBACK]

[RASPING SOUND]

[END PLAYBACK]

What do you think?

RACHEL LEWIS: I think it's someone sanding something.

MOLLY BLOOM: I think that is an excellent guess. Let's hear it one more time.

[AUDIO PLAYBACK]

[RASPING SOUND]

[END PLAYBACK]

Any other thoughts, Rachel?

RACHEL LEWIS: Maybe it could be someone erasing something off a piece of paper.

MOLLY BLOOM: Very good guess. OK, here is Evvie, from Colorado Springs, Colorado, with the answer.

[AUDIO PLAYBACK]

- The noise you just heard was me rubbing finger against the back of a wasp nest. The wasps are not actually in it. It was knocked down and then I brought it in. The wasps actually make their own paper, I think it is, with leaf and spit. So it's kind of cool.

[END PLAYBACK]

MOLLY BLOOM: So you were close when you said paper because that wasp is basically made of paper. And from the picture Evvie sent to us, it looks like she found the nest that was made by paper wasps. And when these wasps make nests, they are essentially making paper with their mouths.

The queen scrapes up wood fibers into her mouth. Her saliva breaks it down to make a soft pulp. Then, she brings it back to the nest site, where worker wasps use the pulp to build a grid of holes shaped like hexagons, where the queen will eventually lay her eggs. When this wet pulp dries, voila-- a papery yet sturdy nest.

RACHEL LEWIS: Wow.

MOLLY BLOOM: Yeah, isn't that cool? Have you seen a wasp nest before?

RACHEL LEWIS: Yeah.

MOLLY BLOOM: Yeah. It's usually not a great thing when you see a wasps nest. But Evvie found one on the ground without any wasps in it, so she was able to explore it, which is super cool. You can follow us on Instagram, if you want to see a picture of the wasps nest that Evvie sent in. We're @brains_on. And speaking of Instagram, if you've got a good guess sheet going for these mystery sounds, post it and tag us.

OK, Rachel, you are doing great. Your ear training has definitely paid off. Here is the next sound.

[AUDIO PLAYBACK]

[SCRATCHING SOUND]

[END PLAYBACK] Any guesses?

RACHEL LEWIS: I think it sounds like a radio.

MOLLY BLOOM: Ooh. Yeah, there's definitely some sound in the background, but I think this mystery sound-- it's very tiny. There's the sound that's not the background hum, but a little squeaky noise. Can you hear it? Let's hear it one more time.

[AUDIO PLAYBACK]

[SCRATCHING SOUND]

[END PLAYBACK]

What do you think?

RACHEL LEWIS: Hmm, I don't know.

MOLLY BLOOM: It's a really tough one. It's probably a sound you're familiar with, though. So here is Autumn, with the answer.

[AUDIO PLAYBACK]

- That was the sound of my wiggly tooth. I like that sound because it grosses my mom out. I've lost six teeth, and the most interesting way I lost a tooth was, I was eating a carrot and then it came out of my carrot. I'm Autumn Bell, from Auckland, New Zealand, and I am eight.

- Hello, *Brains On.* I am Anna and I have a wiggly tooth, too. And I am Autumn's little sister, and I'm five years old.

[END PLAYBACK]

MOLLY BLOOM: So Rachel, now that you hear that sound, does that make a little more sense?

RACHEL LEWIS: Yes.

MOLLY BLOOM: How many teeth have you lost?

RACHEL LEWIS: I don't know.

MOLLY BLOOM: Do you like wiggling them around?

RACHEL LEWIS: Yes.

MOLLY BLOOM: Does it gross you out to hear that sound or do you think it's kind of awesome?

RACHEL LEWIS: Awesome.

MOLLY BLOOM: OK, Rachel, one more mystery sound before we take a short break to let your ears cool off. This one was not sent in by a listener, but it was shared with us by a scientist. Here it is.

[AUDIO PLAYBACK]

[HUMMING AND CRACKLING NOISE]

[END PLAYBACK]

What do you think?

RACHEL LEWIS: I have no idea. Sounds like it has something to do with fire.

MOLLY BLOOM: Oh, because did you-- is that crackling noise in the background?

RACHEL LEWIS: Yeah.

MOLLY BLOOM: OK, do you want to hear it one more time?

RACHEL LEWIS: Yes.

[AUDIO PLAYBACK]

[HUMMING AND CRACKLING NOISE]

MOLLY BLOOM: Any other thoughts?

RACHEL LEWIS: No, I don't think so.

MOLLY BLOOM: OK, something fire related. Here with the answer is Andrew Bass. He's a behavioral and evolutionary neuroscientist, at Cornell University.

[AUDIO PLAYBACK]

- This is the sound of a midshipman fish, during a summer's evening, broadcasting his advertisement call from his nest in the intertidal zone.

[END PLAYBACK]

MOLLY BLOOM: So that crackling sound wasn't fire. It was actually water.

RACHEL LEWIS: So it's the opposite of fire.

MOLLY BLOOM: Yeah. And midshipman fish make all sorts of interesting noises, noises that we don't usually associate with fish.

[AUDIO PLAYBACK]

- And I have to admit, I never get bored of listening to this sound. It's such a remarkable sound, in part because the signal lasts for over two hours, by a single male. And then he'll pause, and he'll start humming again. And the goal of the signal-- the reason it's called an advertisement call-- is because he's trying to attract a female to his nest, to spawn with him.

Midshipman males and females both make sounds, but only males produce this humming call. Females make a sound known as a grunt. It's very brief.

[GRUNTING]

It's a common type of signal made by a lot of animals. And the males also make grunts, when they're in a context in which they're guarding their nest against intruders into the nest. The way that a lot of fish make sound is, they vibrate a gas-filled organ inside of their body, in their belly. And that's known as a swim bladder.

Midshipman fish have a pair of muscles attached to the walls of their swim bladder. And when they vibrate those muscles, that creates a vibration in the surrounding water. And the gas-filled swim bladder amplifies the intensity or the loudness of that sound.

[DRONING SOUND]

There are two very big reasons why I've always studied these midshipman fish. The first is that I want to understand how the brain controls the production of this sound, and how our understanding of that helps us to better understand how other animals, including ourselves, are able to produce sound. So when you think of human beings, we think about their speech. But lots of other animals make sounds, as well. So when you go out at night, in the summer--

[FROGS CROAKING]

--you hear frogs making lots of sounds.

If you're up early in the morning--

[BIRDS CHIRPING]

--you hear the dawn song of birds. And if you're out at night--

[ADVERTISEMENT CALL]

--off the coast of California, you'll hear midshipman fish singing. So it turns out that the major regions in the brain, that control sound production in the midshipman fish, are also found in the same place in the brains of other animals. And all of that can contribute to our understanding of just how sound communication has evolved over time.

[END PLAYBACK]

MOLLY BLOOM: I had no idea fish could make sounds like that.

RACHEL LEWIS: Neither did I.

MOLLY BLOOM: Well, now you'll know that fish can make some pretty cool sounds.

[MUSIC PLAYING]

Are you listening to this in the car?

RACHEL LEWIS: Will you be in the car soon?

MOLLY BLOOM: Maybe you have a summer road trip coming up.

RACHEL LEWIS: Oh, road trip mystery sounds.

MOLLY BLOOM: Yeah, and whether you'll be on the road listening for mystery sounds--

RACHEL LEWIS: --or having adventures at home--

MOLLY BLOOM: --*Brains On* is really excited to share a special summer series with you. We'll be rolling out five special episodes, answering the many car questions that you've sent in. Look for them, throughout the month of June, wherever you get your podcasts.

RACHEL LEWIS: And for the newsletter subscribers, we'll be sharing some cool activity sheets for backseat fun.

MOLLY BLOOM: Whether you're running to school or driving cross-country, these special sheets are guaranteed to turn "are we there yet" moments into breath of fresh air moments. Subscribe to our newsletter and we'll send you a link where you can download the sheets. Go to our website, brainson.org to subscribe.

[MUSIC PLAYING]

RACHEL LEWIS: We love hearing from listeners.

MOLLY BLOOM: You send us fascinating questions, amazing drawings, and deliciously difficult mystery sounds.

RACHEL LEWIS: We could not have made this episode--

MOLLY BLOOM: --or really any episode--

RACHEL LEWIS: --without your help.

MOLLY BLOOM: We started the Brains Honor Roll to thank the kids who keep the show going with their energy, ideas, and questions, like this one sent to us by Anya from Deerfield, Massachusetts.

[AUDIO PLAYBACK]

- How come sometimes you can see the moon during the day and sometimes you can't?

[END PLAYBACK]

MOLLY BLOOM: We'll answer that question in our Moment of Um, and announce the most recent group to be added to the Brains Honor Roll, all at the end of the show.

CREW: *Brains On!*

RACHEL LEWIS: You're listening to *Brains On,* from American Public Media. I'm Rachel Lewis.

MOLLY BLOOM: And I'm Molly Bloom. We have a slew of mystery sounds to test your powers of perception. Are you having fun, so far, Rachel?

RACHEL LEWIS: Yes.

MOLLY BLOOM: What has been the toughest one so far?

RACHEL LEWIS: The water-- I can't remember what it is.

MOLLY BLOOM: The fish one?

RACHEL LEWIS: Yeah.

MOLLY BLOOM: Or the spray bottle? We have two water related ones.

RACHEL LEWIS: The spray bottle.

MOLLY BLOOM: The spray bottle?

RACHEL LEWIS: Yeah.

MOLLY BLOOM: I mean, these sounds, like, there are normal things in life, but once they're taken out of context and you hear them separated from where you would actually hear them, they become really, really tricky. So this one maybe a tiny bit easier. Let's hear it

[AUDIO PLAYBACK]

[CRACKLING AND CRUNCHING NOISES]

[END PLAYBACK]

Any guesses?

RACHEL LEWIS: Yeah, it sounds like someone putting chips in their mouth.

MOLLY BLOOM: Excellent.

RACHEL LEWIS: Maybe someone crumpling up paper or something.

MOLLY BLOOM: OK, so either chips in the mouth or crumpling up paper. Do you want to hear it again?

RACHEL LEWIS: Yeah.

[AUDIO PLAYBACK]

[CRACKLING AND CRUNCHING NOISES]

[END PLAYBACK]

MOLLY BLOOM: Any new guesses?

RACHEL LEWIS: I don't think so.

MOLLY BLOOM: All right, so this is either crumpling paper or putting chips in the mouth. Those are actually two different recordings of the same thing, sent in by two different listeners. And we will let them reveal the answer.

[AUDIO PLAYBACK]

- I'm Oscar and I'm from Melbourne, Australia.

- Hi, my name is Allie, and I live in Mountain View, California. And that was the sound of me crinkling toast in the morning.

- That was the sound of me eating honey toast. I like that sound because I like eating toast. Who wouldn't love toast? My favorite thing to have on toast is Nutella, and I make it myself.

- I love toast. I love putting butter on my toast, with cinnamon on my toast, with jelly on my toast. Toast is half of my life. I love toast.

[END PLAYBACK]

MOLLY BLOOM: [LAUGHS] So you were close. Someone was chewing. What is your favorite thing to put on toast, Rachel?

RACHEL LEWIS: Probably better.

MOLLY BLOOM: Butter-- straight up butter. Yeah, I think I'm a butter toast person, myself. All right, I know everyone is now very hungry for toast and more mystery sounds. So here is the next one.

[AUDIO PLAYBACK]

[BURBLING]

[HISSING]

[POURING]

[END PLAYBACK]

What do you think that one was?

RACHEL LEWIS: [LAUGHS] I think it had something to do with pouring water in something else.

MOLLY BLOOM: Mm, excellent guess. Let's hear it one more time.

[AUDIO PLAYBACK]

[BURBLING]

[HISSING]

[POURING]

[END PLAYBACK]

Any other thoughts?

RACHEL LEWIS: I think it has something to do with the dentist or something.

MOLLY BLOOM: Oh, that's a really good guess. Here with the answer is Veronica, from Brooklyn.

[AUDIO PLAYBACK]

- The sound you just heard is a sound of my dad's SodaStream. To make it work, you place a bottle of water into a machine, press a button, and it releases carbon dioxide. The water and carbon dioxide mixes together and makes the bubbly water, or seltzer, my dad drinks. I like seltzer water because it is really fizzy and it makes my tongue sparkle.

[END PLAYBACK]

MOLLY BLOOM: So you were right, there was pouring water. And then that first bit was the carbon dioxide mixing to make it the bubbly water. Do you like fizzy drinks?

RACHEL LEWIS: Yes.

MOLLY BLOOM: I actually don't like fizzy drinks. I don't like that feeling. It's too sparkly and bubbly for my tongue. All right, the next sound is bubbling up here so let's give it a listen.

[AUDIO PLAYBACK]

[FEEDBACK]

[END PLAYBACK]

Any guesses?

RACHEL LEWIS: Sounds like some instrument.

MOLLY BLOOM: Ooh, excellent guess. Let's hear it one more time.

[AUDIO PLAYBACK]

[FEEDBACK]

[END PLAYBACK]

What else do you think about that sound?

RACHEL LEWIS: It's kind of squeaky.

MOLLY BLOOM: Definitely squeaky. Here is the answer.

[AUDIO PLAYBACK]

- I'm Katrina.

- And I'm June.

- And we're from Rochester, Michigan.

- This is the sound of my sister June's hearing aid, when it is out of her ear. What you hear is the aid when it is sitting in her hand.

- I had these hearing aids since I was six weeks old, and now I'm seven. Wearing hearing aids is a lot like wearing glasses.

- This sound happens when the hearing aid mold is not sealing in your ear canal. You will then hear squealing or feedback from the hearing aid.

[END PLAYBACK]

MOLLY BLOOM: So your guess of an instrument was not that far off, because I'm sure you have heard feedback coming from microphones or maybe, like, electric guitars before. Have you heard that?

RACHEL LEWIS: Yeah.

MOLLY BLOOM: So feedback happens when there's a loop between input and output. And this means when the sound coming in through, say, a microphone is amplified and then sent out by the speaker, and then that amplified sound then goes back into the microphone, and is amplified again, and again, and again, and again, in a loop. That's what's happening with June's hearing aid, too. But we're not going in a loop. We are forging straight ahead to the next mystery sound. Here it is.

[AUDIO PLAYBACK]

[SQUELCHING SOUNDS]

[END PLAYBACK]

Ooh, what do you think of that one?

RACHEL LEWIS: I think it's someone walking on mud with a pail of water.

MOLLY BLOOM: Walking on mud with a pail of water. Let's hear it one more time.

[AUDIO PLAYBACK]

[SQUELCHING SOUNDS]

[END PLAYBACK]

Any new guesses?

RACHEL LEWIS: I don't think so.

MOLLY BLOOM: You're going to stick with the walking on the mud with a pail of water. Here is the answer.

[AUDIO PLAYBACK]

- My name is Nathan. I am 10. I live in Winnipeg, Manitoba, Canada. That is the sound of me walking in rubber boots after I just got a booter.

A booter is when you are walking in deep water with rubber boots, and the water level is too high, and ice cold water rushes into the inside of your boot, and you are left with a boot full of water, or a booter. In the spring, our ditches are full of ice-cold water, and my brother and I love to explore and test how deep we can go. I ended up with about four booters in two days. And as we were walking back to the house, we thought this would be a great mystery sound.

[END PLAYBACK]

MOLLY BLOOM: I agree. It is a great mystery sound. And you were really close, Rachel. They were walking with water, just the water happened to be in the boots.

RACHEL LEWIS: [LAUGHS]

MOLLY BLOOM: Has that ever happened to you before?

RACHEL LEWIS: Not really.

MOLLY BLOOM: Do you like splashing around in puddles?

RACHEL LEWIS: Yes.

MOLLY BLOOM: Yes? I prefer to stay dry, myself. I don't want a booter. now, this next mystery sound is an exciting one, because the family that sent it to us did not know where the sound came from. It was a real, actual, honest-to-goodness mystery sound, and we got to help them solve it. Here is the mystery sound.

[AUDIO PLAYBACK]

[REPETITIVE GRUNTING NOISE]

- OK, we did it. We got it, guys.

- I wanna see, mommy. I wanna see.

- Now send it to *Brains On.*

[END PLAYBACK]

So that was sent to us by twin brothers, Brody and Alex, and their little brother Jesse Rhett, with help from their mom, Tiffany.

[AUDIO PLAYBACK]

- So we were playing in the basement and, all of a sudden, we heard this very strange sound. And we decided that we would like to record it because we wanted other people to hear it. And so we opened up the door. And as soon as we opened up the door, to try to record it, the sound what?

- It stopped.

- It stopped. And then, we tried it again, because it happened again after that, and the sound had stopped. And so finally, we left the phone outside.

- Yeah

- Outside the door, and we closed the door, and we hid behind the curtains.

- You're right.

- And then we waited until the noise happened. And then we were so excited because we got a recording of it.

[END PLAYBACK]

MOLLY BLOOM:

Alex guessed that it was a lizard. Brody guess that it was a frog. And Jesse guessed that it sounded like a dinosaur clearing its throat.

[AUDIO PLAYBACK]

- [THROAT CLEARING NOISE]

- That's pretty good.

- [VOCALIZATIONS]

- Ribbit. Ribbit.

[END PLAYBACK]

MOLLY BLOOM:

Rachel, what is your guess of what that sound is?

RACHEL LEWIS: I think it sounds like a plane.

MOLLY BLOOM: Ooh, a plane. I thought-- when I first heard it, I thought it kind of sounded like power going through electrical lines. But I had no idea what it was. It was definitely a true mystery sound. So we turned to Emily Cabrera for help. She works for the University of Georgia Extension, educating people about agriculture and natural resources. I sent her the sound, and unlike me, she knew right away what it was.

[AUDIO PLAYBACK]

- Well, when you sent it to me, it was-- immediately, OK, that's a bullfrog.

[END PLAYBACK]

MOLLY BLOOM: A bullfrog, Brody was right. unfortunately, you and I, Rachel, were wrong. But without knowing it when we contacted her, Emily was the perfect person to identify the sound for us. At her previous job, she spent a lot of time listening to frog sounds.

[AUDIO PLAYBACK]

- I like frogs-- frogs and toads. They are a really great indicator species, just like some birds are. They tell you whether or not you have a healthy environment. And so we would do these studies. And we would go sit out overnight and listen to the different types of frogs that we would hear, and the frequency that we would hear them. And so it kind of give us an indication of whether a certain area was healthy, environmentally. It's a good sign when you hear frogs and toads.

[END PLAYBACK]

MOLLY BLOOM: And remember how that sound was speeding up?

RACHEL LEWIS: Mhm.

[AUDIO PLAYBACK]

- In any area where there's one bullfrog, there may be a culmination of bullfrogs. Because what the males do is, they get in these groups, and they each have calls, just like we each have a different voice. The sound of our voice is very different. But to a frog, they might say, oh, they all sound the same.

But when we hear bullfrogs, and there's a chorus of bullfrogs, they all kind of sound the same, but there's slight differences. So that's why some of them were speeding up or slowing down, and you might have heard one or two. And what they're doing is, that there's power in numbers. And they're trying to attract the females because this is their breeding season.

[END PLAYBACK]

MOLLY BLOOM: And just like the midshipman fish we heard earlier, this is the advertisement call of the American bullfrog, advertising, hey, ladies, I'm over here.

[AUDIO PLAYBACK]

- They want to call out to a very specific group, and that's the female bullfrogs, but anything else would alarm them. And so if they sense or see a much larger, what they would think of as a predator, coming towards them, then they would stop and they would probably go underwater. They would disguise themselves. They would flee.

[END PLAYBACK]

MOLLY BLOOM: That's why Alex, Brody, Jesse Rhett, and Tiffany had trouble recording the sound and had to get sneaky about it. The frogs were afraid of them. So after Emily solved this mystery for us, we called up Alex, Brody, and Jesse Rhett to hear their reaction.

[AUDIO PLAYBACK]

- Molly, thank you for figuring that out for us. We're so relieved to know.

- There's new sounds. We heard them. There's one that sounds like a monkey, one that sounds like an owl.

[END PLAYBACK]

MOLLY BLOOM: And remember, we always love hearing your mystery sounds. You can email them to us anytime at brainson.org. Well, listening to all those mystery sounds, Rachel, I am hungry for some toast.

RACHEL LEWIS: While we're waiting for our bread to become toast, let's answer the Moment of Um.

CREW: Um, um, um, um, um, um, um, um, um, um, um, um, um, um, um, um, um.

[AUDIO PLAYBACK]

How come sometimes you can see the moon during the day and sometimes you can't?

[END PLAYBACK]

[AUDIO PLAYBACK]

- My name is Sarah Comprud, and I teach astronomy, here at the Bell Museum.

[MUSIC PLAYING]

The reason we can see the moon sometimes during the day is because the moon orbits the Earth. There is a misconception that the sun means it's daytime and the moon beams it's nighttime. The only reason we have daytime is because of when the sun is up. When the sun's not up, that means it's nighttime. So night has absolutely nothing to do with the moon.

If you imagine the Earth, being a little ball out floating out in space, and if you were to draw a circle around it, that is the orbit of the moon around the Earth. Now the moon orbits one time around the Earth every month. So for about two weeks of that month, it's on the side of the Earth that's facing the sun. For the other two weeks a month, it's on the side of the Earth that is not facing the sun.

So for two weeks of the month, the moon is out during the daytime, and for two weeks a month, it's out at night. The moon is up for roughly-- I'm going to round here-- for roughly about 12 hours a day. Well, it will rise and set at different times each day, just like the sun rises and sets at slightly different times each day. So it has to do with where the moon is in its orbit around the Earth.

So for today, which is the first day of June, the moon will be out this afternoon. And if you look this afternoon, and towards the evening because we're getting to, I believe, around the first quarter moon, you'll see it the end half of the day and the first part of the evening. But it will set partially at night, and so you will not be able to see the moon really late at night, because it will have already set.

[END PLAYBACK]

[MUSIC PLAYING]

MOLLY BLOOM: Rachel, while you get the Nutella and jam out, I'm going to read the most recent Brains Honor Roll.

RACHEL LEWIS: Great idea.

[MUSIC PLAYING]

[LISTING HONOR ROLL]

[MUSIC PLAYING]

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

[MUSIC PLAYING]

RACHEL LEWIS: *Brains On* is produced by Mark Sanchez, Sanden Totten, and Molly Bloom.

MOLLY BLOOM: We had engineering help this week from Cameron Adkins, Corey Schreppel, and Veronica Rodriguez.

RACHEL LEWIS: And production assistance from John Lambert.

MOLLY BLOOM: Many thanks to Donna Lewis, Lauren Dee, Louise McDonald, Elizabeth Sylvan, John Paris, Chris Hoffer, Anne Eller, Dana Mutashwick, Zach Korb, Ellen Williams, Jonathan Bell, Kari Karcher, and Abra Lee.

RACHEL LEWIS: You can keep up with us on Instagram and Twitter.

MOLLY BLOOM: We're @brains_on. Tag us if you post a picture of your guest sheets.

RACHEL LEWIS: We're on Facebook, too.

MOLLY BLOOM: And if you're a fan of the show, tell your friends about us. Subscribe to us on Spotify, NPR One, Stitcher-- wherever-- and consider leaving a review on Apple Podcasts. It really helps other kids and parents find out about the show.

RACHEL LEWIS: Thanks for listening.

[MUSIC PLAYING]