CHILD: You're listening to *BrainsOn,* where we're serious about being curious.

MOLLY BLOOM: Hello. Hello. Hello. I'm your host, Molly Bloom. And today, our producer, Marc Sanchez, is joining me.

MARC SANCHEZ: Hello. Hello. Hello, Molly. Today, we're going to tackle a question about sneezing. Why does the heat of the sun provoke sneezing and not the heat of the fire? Interesting question, right?

MOLLY BLOOM: Right. But that wasn't from one of our listeners.

MARC SANCHEZ: Nope. This question was asked over 2,300 years ago.

MOLLY BLOOM: By Greek philosopher and scientist Aristotle.

MARC SANCHEZ: Which leads us to Kaitlyn and Megan from Portland, Oregon.

KAITLYN: Hi. I'm Kaitlyn. And I'm nine years old.

MEGAN: Hi. I'm Megan. And I'm seven years old. Our question is why does the sun make you sneeze?

KAITLYN: Whenever I come out from the store, from school, and out to recess, if it's a sunny day and I happen to glance up at the sky, I sneeze.

MEGAN: We don't know why we sneeze when we look up at the sun.

MARC SANCHEZ: They ask pretty much the same question as Aristotle.

MOLLY BLOOM: 2,300 years later. To find an answer, we turned to Dr. Louis Ptácek.

MARC SANCHEZ: He's a neurologist and human geneticist.

MOLLY BLOOM: Yeah, he studies the brain and the genes that make up all humans.

MARC SANCHEZ: So why do we sneeze when we look at the sun?

LOUIS PTACEK: The bottom line is that nobody knows.

MOLLY BLOOM: 2,300 years later, and still nobody knows.

MARC SANCHEZ: But Dr. Ptácek has looked into the phenomenon. It's called photic sneeze reflex.

LOUIS PTACEK: You know what reflexes are. When you touch a hot stove accidentally--

MAN: Ouch!

LOUIS PTACEK: Even before we realize that it's hot, we've begun to draw our hand away. There are many reflexes in all animals, but certainly in us humans. And so people speculate that perhaps photic sneeze is an abnormal reflex where a stimulus, like bright light, somehow leads to activity in the part of the brainstem where the nerves are that cause the sneeze to be initiated.

MARC SANCHEZ: Normally, sneezing is our body's way of getting an irritant out of our airways.

MOLLY BLOOM: Let's say you breathe in some dust or mold.

MARC SANCHEZ: Black pepper is always a good bet.

MOLLY BLOOM: Take a big whiff of black pepper, and it gets caught in the lining on the inside of your nose.

MARC SANCHEZ: The mucosa.

MOLLY BLOOM: Our bodies kick into action.

[ALARM SOUNDING]

MAN: Pepper in the mucosa. Repeat. Pepper in the mucosa.

MARC SANCHEZ: First, the phrenic nerve sends a signal to the brain.

PHRENIC NERVE: Pepper alert! Pepper alert! Hey, brain, we got a pepper emergency.

BRAIN: Don't worry. I got this. Diaphragm contract.

MOLLY BLOOM: The brain sends a message back down the phrenic nerve, telling your diaphragm--

MARC SANCHEZ: The muscle beneath your lungs.

MOLLY BLOOM: To contract and expel air.

MARC SANCHEZ: Which we know as--

[SNEEZING]

MOLLY BLOOM: A sneeze. So photic sneeze reflex triggers a sneeze, even when there's no irritant present. Dr. Ptácek has been studying photic sneeze reflex over the years. It turns out Kaitlyn and Megan have their parents to thank for this condition.

LOUIS PTACEK: About 10% of the entire population has photic sneeze reflex. If someone doesn't and they hear about this, they say, wow, that sounds really funny. If you tell this story to someone who has photic sneeze reflex, they will often say, oh, really? Doesn't everybody do that? Because they do it, and some of their family members do it. It doesn't seem to have any benefits as pulling our hand away from a hot stove would, but it occurs in a large number of people for reasons that are completely unclear.

MARC SANCHEZ: So we know that sneezing from the sun is probably genetic. But we still don't know why some people are wired to do this.

MOLLY BLOOM: We'll get back to why Dr. Ptácek thinks we should study photic sneeze reflex in just a minute.

SINGERS: Ba, ba, ba, ba, ba, ba, ba, ba, ba, ba, ba, ba, Brains On.

MARC SANCHEZ: Speaking of the sun, our friends at the Public Radio show*Science Friday* are celebrating the sun all throughout the month of May by sharing cool facts about it.

MOLLY BLOOM: They're calling this party "Explain the Sun." And guess what? You're invited.

MARC SANCHEZ: All you have to do is learn something cool about the sun and share it.

MOLLY BLOOM: You can do a video. You can draw a picture. You could sing lyrics about the sun over a Taylor Swift song.

MARC SANCHEZ: (SINGING) The sun's a [INAUDIBLE] sphere sphere sphere sphere sphere.

MOLLY BLOOM: (SINGING) When it's hot it's going to flare, flare, flare, flare, flare.

MARC SANCHEZ: Shooting electrons and atoms and ions.

MOLLY BLOOM: Solar flare. Solar flare.

MARC SANCHEZ: Or something like that.

MOLLY BLOOM: Send your sun facts to us, and we'll share some of our favorites next time.

MARC SANCHEZ: To get your creativity flowing, here are some sun-planations from Lisa Parker's fourth-grade class at Harold C Johnson Elementary in South Carolina.

CHILD: Did you know?

CHILD: Did you know?

CHILD: Did you know?

CHILDREN: Did you know?

SHELBY: I'm Shelby from York, South Carolina. Did you know the diameter of the Sun is 864,938 miles? You can fit 109 Earths across the sun's diameter. That just means 109 earths can fit across the sun.

COLBY: Hi. I'm Colby from Rock Hill, South Carolina. And I'm nine years old. Did you know when light from the sun is blocked by the moon it causes a solar eclipse?

BAILEY: My name is Bailey, and I'm from York, South Carolina. I'm 10 years old. Did you know the temperature of the core-- that's the inside of the sun-- can reach up to 27 million degrees Fahrenheit? That's 15 million degrees in Celsius.

[CHIME]

MOLLY BLOOM: Hey, Marc?

MARC SANCHEZ: Hmm?

CHILDREN: Do you hear that?

MARC SANCHEZ: Is that what I think it is?

MOLLY BLOOM: It's time for the mystery sound.

[WHISTLING SOUND]

CHILD: (WHISPERING) Mystery sound.

MOLLY BLOOM: Here it is.

[RATTLING]

Any guesses?

[RATTLING]

Here's the answer.

MADELEINE: I'm Madeleine from Pendleton, Indiana. And I'm eight years old.

JACKSON: I'm Jackson. And I'm five years old. That is the sound of a golf ball going in the hole. I like that sound because it reminds me of my family playing miniature golf.

MOLLY BLOOM: Thanks to Madeleine and Jackson for sending in that completely awesome mystery sound. Next time you're out and about mini golfing--

MARC SANCHEZ: Or soccer-ing--

MOLLY BLOOM: Or just exploring your neighborhood--

MARC SANCHEZ: Keep your ears open for good mystery sounds.

MOLLY BLOOM: They are everywhere. You can send them to us at Brains On at M as in Minnesota P-R dot org.

MARC SANCHEZ: You can also send us questions and high fives at that email address, or find us on Twitter and Instagram at brains_on.

MOLLY BLOOM: Speaking of high fives, it's time to unveil the latest group of Brains Honor Roll-ees.

MARC SANCHEZ: Oh, yeah. You're the kids that keep the show going with your ideas, mystery sounds, drawings, and letters. So without further ado, the Brains Honor Roll.

[MUSIC PLAYING]

MOLLY BLOOM: [LISTING HONOR ROLL]

OK. Back to sneezing.

MARC SANCHEZ: We know that about 10% of people sneeze when exposed to bright light.

MOLLY BLOOM: Like when you come out of a dark movie theater on a sunny day.

MARC SANCHEZ: But there's nothing really wrong with an extra sneeze now and then. So there's not much interest in figuring out how to stop this.

MOLLY BLOOM: But Dr. Ptácek thinks that finding the genes that cause photic sneeze reflex could help in treating people with more serious problems.

LOUIS PTACEK: In some percentage of patients with epilepsy, if some of those patients are exposed to flashing strobe light, in some cases that can precipitate a seizure. Some of your listeners will have heard about this in Japan, where a particular video game and the flashing movements on the screen was causing some children in Japan to have seizures, for example.

So there are many different reflex phenomena, some of which are problematic. I mean, having seizures, obviously, is a much more serious thing to happen than sneezing. But it is my thought that if we could understanc what it is that causes photic sneeze reflex, that it might teach us something about some of these other reflex phenomena.

MARC SANCHEZ: Some mice and a handful of people are known to have seizures when they hear a loud noise.

MOLLY BLOOM: Dr. Ptácek's lab has been able to isolate and clone the gene that causes these kind of seizures. And in doing that, they might be able to figure out a way to stop those seizures.

MARC SANCHEZ: The same might be true for seizures brought on by strobe lights. And looking for a gene that causes photic sneeze reflex could be the first step.

MOLLY BLOOM: To Kaitlyn and Megan--

MARC SANCHEZ: And all the photic sneezers out there--

MOLLY BLOOM: There's no known reason for why you sneeze when you see a bright light.

MARC SANCHEZ: Maybe you can just think of it as being part of a special club. Kind of a-- [SNEEZES] a sneeze club.

MOLLY BLOOM: That's it for this episode of *Brains On.* If you have a minute, please rate us on iTunes. And if you're feeling extra inspired, leave a little review.

MARC SANCHEZ: Of course, you can always get in touch with us on Instagram and Twitter. We're at Brains_On.

MOLLY BLOOM: And remember to keep sending in mystery sounds, ideas for future episodes, or comments about the show. Brains On at M as in Minnesota pr.org. Thanks for listening.

[MUSIC PLAYING]