

But Why: A Podcast for Curious Kids

Why Do We Poop And Fart?

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[Jane] This is *But Why: A Podcast for Curious Kids* produced at Vermont Public Radio. I'm Jane Lindholm.

[Jane] And today, we're going to talk about something everyone does, but a lot of people don't want to talk about it, at least not in polite conversation.

[Jane] So tell your adults that today, right now, just as long as this episode is going on and maybe if you have questions afterwards, you have permission for some potty talk because we are going to be discussing poops and farts. That's right. I said it. Poops and farts. Get all of your giggles out. Go ahead. In a couple of minutes, we'll learn about where your poop actually goes after it leaves your body. There's a whole infrastructure set up to take it away from you and away from your house. But first, some fundamentals.

[Miles] Hi, I'm Miles. I live in Minneapolis and I'm three years old. How does food get made into poop or pee?

[Violet] Hello, my name Violet and my little sister's name is Mina. She's three and I'm five. We both live in Toronto, Canada. We want to know why we poop.

[Sylvia] Hello, my name is Sylvia and I'm three. My question is, how does your tummy make your food into poo? I'm from England.

[Enzo] My name is Enzo and I live in Austin, Texas. I'm five and a half. My question is, how does your body turn the drinks and food into poop and pee?

[Jane] The human body is an amazing machine. We've talked about some of its remarkable functions and features in our two previous episodes all about bodies. But let's zero in on the very impressive and efficient system our body uses to take in food, get what it needs and get rid of the rest. It's called your "alimentary canal", your digestive system or your gastrointestinal track. As you know, we need to eat to survive. We eat food, and drink water and other liquids to keep our bodies hydrated and to give ourselves the energy and nutrition we need to run and jump and study and remember and play and grow and love and think. I'm not going to focus too much today on the way we get the nutrients from the food into our bodies because we want to get down to the bottom end of the process. But basically, when we take a bite of food, that starts the process of digestion.

The food mixes with saliva, which helps to break it down. When your lunch is in your stomach, your stomach muscles mixes it like a blender, with even more chemicals, your stomach juices, to break the food down even smaller. Then the sloshy mixture gets pushed into your intestines. That's where a lot of it is absorbed into your body, so you can do all of those activities I mentioned before.

Your body will squeeze all the good stuff it can out of the food you eat, which is why it's important to eat a healthy, balanced diet full of plants and vegetables, healthy fat, protein, some carbohydrates.

The better you eat, the better your body is able to function, which, by the way is probably why the adults in your life might sometimes have to use, let's call it "strong encouragement," to get you to eat better.

A lot of digestion happens in your intestines, and picture this:

If you stretched out the intestines that are kind of curled up and stuffed inside your body, it would be really long. In an adult, the small and large intestines are more than 25 feet long!

That's longer than a city bus.

But the food that can't be absorbed into your body needs to go somewhere. It can't stay in your body forever, so it becomes, you guessed it, poop. The official word for poop is "feces". You might also hear the word, "stool" or "excrement." Sometimes families have different words they use that mean the same thing. The long and short of it is that poop is the stuff your body can't use. It's basically a mixture of fiber and cells from your body and water. It's mostly water. Depending on what you've been eating and how healthy you are, it can have different shapes and textures. I said at the beginning of this description that it's an amazing system, and I know we think of poop as kind of gross. But think about it, within a day or so, your body has turned, say, a roast beef sandwich, apple and peas into all kinds of nutrients for your body to use and it has pushed the rest of it out of your body, making room for more food and ensuring that all the bad stuff doesn't stay inside you. By the way, pee is made in a different but complementary system. Pee, or urine, is the way your body gets rid of nutrients and waste products from your bloodstream. You do make more pee the more liquid you drink. But that's a good thing. If you want to keep all your cells healthy and bathed, hydrated, it's generally a good thing if you drink a lot of water. You want your pee to be light yellow. If it's dark yellow, you probably need to drink more water.

When we come back, we'll learn about where your poop actually goes after you flush the toilet.

This is *But Why: A Podcast for Curious Kids*. I'm Jane Lindholm, and today we're learning more about poop and why it happens.

[Henry] My name is Henry. I am seven years old. I live in Brooklyn, and my question is, how many germs are in one ounce of poop?

[Jane] The answer to this question, Henry, is pretty amazing. One trillion germs can live in a gram of poop. A gram is about the weight of a paperclip, and there are twenty eight grams in an ounce. So that's twenty eight trillion germs, perhaps, in one ounce of excrement. Excrement is another word for poop, remember? Now, just so you have an idea of how much poop we're talking about, I looked up things that weigh about an ounce and came up with a kind of strange list. A slice of bread weighs about an ounce, 28 paperclips, since we're talking about 28 grams, five U.S. quarters or 11 pennies, or get this, ten ruby throated hummingbirds. That's about an ounce. But I'm getting off track. Basically, there are a lot of germs in poop, but not every single one of the germs in that ounce of poop is going to make you sick. Nonetheless, there are some that could. That's why it's so important to wash your hands with soap after you go to the bathroom. For humans, so much of our ability to stay healthy has depended on how we deal with poop so that no one has to get sick from it. We need to be able to drink and use clean water

without poop bacteria in order to be healthy, and we don't want poop around to get on any objects that then find their way into our mouths. So, a whole infrastructure has been built up to take the poop away from our toilets and send it somewhere else. Want to know more about that? So did one curious kid in Chicago. So a different podcast called Curious City at the Chicago Public Radio Station WBEZ took on the question. We're going to play you the episode of Curious City where they take a look at where all the poop in Chicago goes. Let's listen.

[Shannon] It's Curious City, where WBEZ answers your questions about Chicago, the region and its people.

I'm Shannon Heffernan, a reporter at WBEZ. This week, I'm answering the question, what happens when you flush the toilet in Chicago? It came to us from somebody who was five when she asked the question.

When did we start thinking about that? Kind of around the time when you were first learning how to use the potty, I think. That's Emily Hendel. Her daughter Satchel was a little shy when she first met us and occupied coloring. She thought maybe all the poop went to a big tank somewhere in their house.

[Emily] Where do you think the tank might be?

[Satchel] In the basement.

[Shannon] Now, before you tune out and think, "I know this one. I'm no five-year-old." I want you to stop and think, do you really? Because it's actually kind of important.

[Shannon] Ever since humans settled in big cities, it's been a problem we had to face. Where do we put the poop? Because if you don't deal with it, people are going to get sick, and dealing with millions and millions of gallons of poo? It's a complicated task. So today we walk you and Emily and Satchel through the highlights of what happens after you flush. You'll hear them react to what we learned, starting from their house.

Could you show us where your toilet is? Can we start with that? We can look at the pipes and maybe try to start tracking it from that spot?

See that when you flush it, it goes down here, it goes into the pipes. But come with me and we'll show you one that goes after that. All that water flows out and it goes to pipes that run down the middle of the street.

Those pipes go to one of seven different sewage plants run by the Metropolitan Water Reclamation District of Greater Chicago. One of those plants, Stickney, is just southwest of the city. I talked to Reed Drink, the Head of Operations at Stickney. If he needs to, he can process a million gallons of sewage in a minute.

[Reed] So I can do in a minute, what the averaged sized treatment plant does in a day.

[Shannon] He says his plant takes up 400 acres, the size of 302 football fields. It's the biggest sewage plant in the world.

[Reed] We are number one in the "number two" business.

[Satchel] Poop is number two and pee is number one.

[Shannon] Once the sewage gets to the plant, the first step is to go through the coarse screens.

The screens are there to stop really big things from getting into the sewage plant, like branches or pieces of concrete. Remember, it's not just what we flush that ends up in the plant. It's rainwater and all the stuff that washes off the streets and into the sewers. Reed Drink says they've found all kinds of things.

[Reed] Fish, turtles.

[Satchel] How did turtles get in there? They're so big.

[Reed] A bowling ball. We had a bowling ball come in.

[Emily] Whoa.

[Satchel] That is ridiculous!

[Emily] It is ridiculous.

[Reed] Well, sure. Crew found a prosthetic leg. We've seen money. Whenever there's a storm a lot of guys like to work near the coarse screens because money comes up on the conveyor.

[Shannon] The next step is pretty simple. The settling tanks. Here things, well, settle. Solids sink to the bottom. Fats and oils float to the top. Big scrapers come along and take both away to a landfill. The clean water in the middle flows into a big tank.

[Satchel] As big as the Willis Tower?

[Shannon] Maybe not as big as the Willis Tower, but as big as your house.

[Emily] Whoa.

[Shannon] Yeah. It doesn't look like much is happening in this big tank, but there is a whole world of micro-organisms below the surface. The woman who looks at the micro-organisms is Toni Glymph-Martin. She calls these microorganisms, "bugs".

[Toni] A lot of people ask us, where do we get the bugs from? Well, when you flush the toilet, when it rains, all of that brings in just millions and millions of microorganisms to the treatment system. But what we do here, is we provide an environment for a particular type of microorganism.

[Shannon] Remember, sewage can make us sick.

It's full of all kinds of nasty stuff like bacteria and viruses. But not all microorganisms are bad for us. In fact, most of the bugs in this tank eat the stuff that can hurt us, and it's Glymph-Martin's job to keep the helpful ones happy. She spends her day counting, literally one by one, the different types of bugs.

[Toni] Look cause we have a little powder here for you. This is amoebas free swimmers, crawlers...

[Shannon] This gives her clues, tells her if they need to make adjustments to keep the microorganisms in balance. She gave us a video of one of her favorites.

[Emily] This one's called a water bear.

[Satchel] What?

[Emily] Yeah. It's kind of cute, right? A little snout.

[Satchel] It's so cute.

[Emily] And so when she sees these guys in the water, she's like, "Okay, our water is doing okay."

[Toni] They're a good indicator to have in the system because they're very sensitive to ammonia and toxicity. So if we see them thriving in the system, then it means that the water's relatively clean.

[Shannon] So after all, the microorganisms have removed most of the bad stuff, the water is sent to the river system, but there's still some stuff leftover. Solids. We are going to skip a few steps here. Basically, what you need to know is that solids get dried out and go through another round of microorganisms. Eventually, one of the places the solids can end up is in a compost pile.

[Satchel] Compost?

[Shannon] A compost. Do you have a compost?

[Emily] You have a compost bin? You do.

[Shannon] And what happens to your compost bin? What do you know about compost?

[Satchel] It gets stinky.

[Shannon] Compost gets stinky at the Stickney plant, too. I learned this during a tour with soil scientist Lochefinder Handal. He shows me gigantic, I mean gigantic piles of compost.

[Shannon] It's like a spectrum of stink here. The farther I go along, the more it stinks.

[Lochefinder] Yeah, because it's early in the process.

[Shannon] The far away piles are newer and smellier. Nearby, the piles have been sitting for months as they sit. They get hot and it kills off some of the harmful stuff. The result is a super-rich compost called biosolids. There's actually this big, beautiful greenhouse right in the middle of the sewage plant. It's full of orchids and lush grass. Here Handal tests how well the plants do in biosolids.

[Lochefinder] Nature is the best way of recycling everything. You can see here we are growing some spinach.

[Shannon] Biosolids from Chicago are already being spread on golf courses and parks. In fact, one day the District says Chicagoans might be able to buy it for their gardens. The District says the biggest challenge to selling biosolids will be the ick factor. No one wants to think about poop when they smell their garden flowers. But if someone isn't thinking about it, taking care of the pipes and tanks, the microbes, the compost, then the rest of us wouldn't be able to flush and forget. Satchel, next time you poop, I want you to think about it, okay?

Reporting this week came from me, Shannon Heffernan. Support comes from the Conant Family Foundation. We first read the story in 2015 and since then, the Metropolitan Water Reclamation District now makes biosolid compost available for the public. Go to their website to learn how to purchase your own treated poop for your backyard. As of November 2018, Satchell Lang is 9. She's less interested in poop, but is very interested in animals and space. Thanks for letting us rerun the story, Satchel.

[Jane] That was an episode of Curious City from Chicago Public Radio station WBEZ. You can listen to more episodes from Curious City by subscribing to their podcast or finding it at WBEZ dot org. It's not a podcast for kids, but it is a podcast for curious people of all ages.

[Jane] So you and your family might enjoy it, especially if you live in Chicago. Depending on where you live, your poop might go through a system like Chicago's. Most cities and lots of towns with apartment buildings and houses close together have septic systems with pipes that carry human waste away from your home and into a kind of waste treatment facility where it can be sterilized so it can't make you sick. But in more rural parts of the United States and many other countries, there are other systems. I live in the countryside in Vermont and at my house when we flush the toilet or take a shower or use the sink, our water and waste products go down through the pipes in our house and into a big tank that's buried in our yard. The poop and solid materials get stored in that tank and the liquid filters out under a big field, actually across the road in my case. It's called a leach field. Every couple of years, a septic company comes in with a big truck and a suction tube and they suction all the solid waste out of that septic tank buried in our yard. From there, it goes into the type of system we heard about before, it goes to a treatment facility. You might want to ask your adults if you're curious about how the system works, where you live.

[Leo] My name is Leo and I'm from Portland, Maine, and I'm six. My question is, why do people toot?

[Ezra] Hi, my name is Ezra and I'm seven and I'm from Woodland, Delaware. I want to know what are farts made of?

[Jane] You fart because you eat. When you eat, you're not just swallowing food. You're also swallowing air. Air is a combination of gases like nitrogen and oxygen. And those gases make their way through your digestive system. Sometimes that gas you've swallowed comes out as a big burp or belch. But if it doesn't, it still has to come out somehow, and that's where farts come in. Small amounts of the air you swallow travels through the digestive system along with your food. At the same time, the bacterium in your body that helps break down your food during digestion is creating other gases, gases like methane, carbon dioxide and hydrogen. That gas builds up in your intestines and sometimes it can get really uncomfortable. I bet you know what that feels like. That's your

body's way of telling you that you need to get rid of that gas, and you do it by farting. The more official word for a fart is "flatus," and farting is sometimes called flatulence. But sometimes people have other words like "tooting," "passing gas," "passing wind" or "cutting the cheese". While not everyone likes to admit it, everyone does fart. In fact, you expel gas from your body by farting or burping about 20 times a day. Remember before how I talked about the amazing way our bodies work? Well, just think about it. You know sometimes you need to fart and you're able to do that without pooping. I know this sounds kind of gross, but think about how amazing that is. Your body can tell the difference between poop and a fart. Usually, anyway. It can help expel the one that you want to expel or get rid of when you need to do it. That's remarkable. Now sometimes farts are quiet, sometimes they're loud, some people find them funny and some people find them embarrassing. But remember, everyone farts.

[Lennox] My name is Lennox and I want to know why are toots stinky?

[Charlotte] My name is Charlotte, I am nine years old and I live in Ogden, Utah and my question is, why are farts stinky?

[Nina] My name is Nina, I'm six years old. I live in Maryland. My question is, why do farts stink?

[Jane] The smell of your farts has a lot to do with the bacteria that live in everyone's lower intestines. As these microbes help convert our food to nutrients, they make kind of smelly gases sometimes. But how smelly a fart is really does vary from person to person. Some of that has to do with diet. If you eat more foods like beans, broccoli and cauliflower, you might have smellier farts. Now some people don't have enough of the enzymes that process lactose -that's the natural sugar that's in milk- they can have smelly farts when they eat dairy products. Fiber from wheat, corn and potatoes can also give you gas. Really, though, almost any food can give you gas, and as we said before, everybody farts. But if you find that your belly is often upset or it really hurts to fart frequently, that might be something you need to talk to your parents or doctors about. Okay, that's it for today. I hope you now have a better understanding of why and how we poop and fart, and also where that poop goes. You know, there is no question we are too embarrassed or ashamed to tackle here on But Why, and that's for two reasons. Number one, if you have a question, we want to help you find the answer, and number two, we are as curious about the way the world works as you are. We believe that knowing more about the world is a good thing, so keep your questions coming. You can ask us a question about anything that has you curious. Maybe there's something that's troubling you that you've been wondering about the world, about politics or history or culture, or why humans behave the way they do.

So keep your questions coming. Have an adult record you. Use a smartphone if you have one. You can tell us your first name, your age, where you live and then what you're curious about.

Now, if you're very shy or if talking is difficult for you, you can always just send us an email instead. Our address for emails and for audio files is questions@butwhykids.org. But Why is produced by Melody Bodette and me, Jane Lindholm at Vermont Public Radio. We have help from amazing people like Jonathan Butler and Noah Villamarin-Cutter. Luke Reynolds made our theme music.

We'll be back in two weeks with an all new episode. Until then, stay curious.