But Why: A Podcast for Curious Kids

How Do Bees Make Honey And Why Do They Sting?
August 28, 2017

[00:00:03] [Jane] This is *But Why: A Podcast for Curious Kids*. I'm Jane Lindholm.

[Mister Chris in background singing]

Hello little Pollinator, Hello little Honey Bee
Do you like the taste of flowers early in the morning
Goodbye little pollinator goodbye little honey bee
I didn't catch your name for faster than you came
Quick away you flew; you've got a job to do, don't you?

[00:00:28] [Jane] Today we're buzzing about bees. We're going to talk all about pollinators and honeybees and stingers. And later we'll hear from one kid who got so interested in pollinators, he's working to help save them.

[Sound of thousands of bees buzzing] [Jane] Those are the sounds of [00:01:20] thousands and thousands of bees right outside my house. [00:01:25] I am a beekeeper. Have you ever seen a bee keeper? We look pretty silly when we are wearing our bee suits to protect our faces and bodies from getting stung… big white suits with a screen over our heads. Beekeepers help keep a colony of honeybees healthy and safe and we sort of farm them for their honey. Here in Vermont, right now, the fields are full of bright yellow goldenrod, one of the honeybee's favorite foods, and I'll be harvesting the honey from my beehives in the next few weeks. So we thought this was a good time to answer some of the questions you've been sending us about bees. To help me out, I paid a visit to a beekeeper who has a lot more experience and a lot more bees than I do.

[00:02:11] [John] Hi, I'm John Hayden and I'm an organic fruit farmer at The Farm Between in Jeffersonville, Vermont. [00:02:18] I am putting on my bees suit so that if the bees get angry and I'm dressed in white, they don't see me as well. They won't think I'm a bear and they won't sting me through my clothes. [Sound of zipper] So that's zipped up, taking my hat off, putting on my hood, my veil here. Now we're getting our smoker ready. So we just lift this and I'll some air through it to get the smoke on.

[00:02:48] [Jane] What does the smoke do?

[John] Smoke makes the bees think that there is a forest fire and if you're a bee hive in a forest and the forest fire's coming, you need to move. So what they start doing is eating honey, they start filling up on honey in case they have to move. When they eat honey they get more docile so it keeps them calm.

[00:03:06] [Jane] Yeah, "docile" means calm, less likely to sting you.

[John] We like docile bees.

[Jane] Well, we have a lot of bee questions. Our young listeners are big bee fans and very curious about bees. I'm excited to talk with you.

[John] Yeah, it’s going to be great.

[Jane] Where do you keep your bees, John?

[00:03:27] [John] We keep ‘em in our yard right here, pretty close to all our fruit and berry bushes, fruit trees and berry bushes, and I also have some of them in another location that I put up at another vegetable farmer’s who wanted the bees for pollination. So, you can see, I'm counting my hives I don't even know how many I have now. [00:03:46] [counts out loud] 1, 2, 3, 4, 5, 6, 7, 8, 9 here right now.

[00:03:50] [Jane] How many bees do you think you have?

[John] I have approximately 450,000 bees.

[00:03:56] [Jane] You know you mentioned that your bees are pretty near your fruit trees and fruits and berries and flowers and, of course, that's what bees love. So maybe this would be a good time to answer our questions about pollination.

[00:04:12] [Keiler] My name is Keiler, I’m 6 years old, I live in Meridian, Idaho and my question is “How does pollinating happen?”.

[00:04:21] [Anita] My name is Anita, I am 6 years old, I live in Calais, Vermont. [00:04:25] My question is “Why do bees pollinate?”.

[John] Pollination is kind of a deal that flowers have made with bees. So bees, they're vegetarians right? So, they eat pollen and they feed pollen to their babies… their young, the brood, and they drink nectar for energy and then they use the nectar just to make honey, too. So the flowers are producing both pollen and nectar for the bees to entice the bees, to lure the bees in to come and spread pollen around. So, for a flower to reproduce, you know, a plant wants to make babies, make seeds (and those are the babies)…for that to happen, the plants have to pollinate. So the bees are the ones who spread the pollen, which is the boy part of the flower, into the female part of the flower. So it's all a deal, [00:05:18] the bees get the food and the flowers get to reproduce.

[Jane] And the bees aren't doing this thinking they're doing a good thing for the flowers, the bees are just trying to get their food. But as they go from one flower to the next, they're leaving some of that previous flower at the next flower so, you know, it's kind of a tricky deal. 00:05:35] Neither one really knows what they're doing.

[John] Right, well I don't know, it seems like the plants are a little smarter in enticing the bees and they know what they're getting out of it. So yeah, but it's very it's true. I don't know what bees think. [00:05:46] I don't think anybody really knows what bees think. And sometimes people even think of a beehive as one whole organism, one animal, and that the bees are just little cells that are all working together, kind of like the cells in our body work together.

[00:05:57] [Jane] Why do they think that, because bees communicate in this really interesting way?

[John] Yeah, in interesting ways, like the way our cells can communicate through each other. There's a thing called a “hive mind” when they all decide to swarm and leave the hive or when they're hanging out in a tree looking for a new home they all decide to go to

one place. So, we don't know how they really make these decisions and we make guesses and we try to figure it out through science but we haven't figured it out yet.

[00:06:21] [Jane] Alright, here's a question from Lily.

[Lily] I'm 4 years old and I live in Plymouth, Michigan and my question is "Do bees come out in Spring?".

[Jane] Do bees come out in Spring?

[John] So native bees are really interesting. Bumblebees are out, [00:06:39] some come out really early in the spring and those are the ones that are doing most of the work on our early flowering trees, like we have cherries and plums. We have a few apricots and things like that that flower really early. Honeybees are still resting, they're still on winter vacation. When these bees (bumblebees) are out it's like 45-50 degrees and a little cloudy or drizzly… they're out fizzing those flowers. Honeybees come out whenever the weather is warm enough for them to come out so they like it above like 55 degrees and sunny and not too rainy and not rainy and then they'll come out. So even in the winter time, sometimes you'll see bees coming out and it's good for them to come out. They come out, they go to the bathroom and just, you know, fly and get some fresh air, I think, but mostly in the spring is when they are starting to do all to build up their colony numbers. So it's when the queen really starts laying eggs and then they really start getting to work collecting pollen and nectar. And usually pollen in the spring is really important because that's what they feed to their babies and they want to build up their numbers really fast. So they collect a lot of pollen in the spring.

[00:07:42] [Jane] And what did they do in the wintertime?

[00:07:44] [John] So in the wintertime they have to keep their hive at a constant temperature. I think it's around 90 degrees. So they cluster together and they buzz and they vibrate and they dance and they breathe on each other. So they make a "cluster" it's called, and it's like a ball of buzziness and by creating all that energy and moving around they keep themselves warm. But to do that, they need to have honey and honey is the energy that keeps them warm and, in the winters, the food they need to keep going. It's really interesting because the bees will be on the outside of the ball and they look cool, then they move to the inside and the bees that are on the inside that are warm will move to the outside. They've got it figured out.

[00:08:22] [Jane] And that goes for native wild bees as well as domesticated, well, semi-domesticated honeybees?

[00:08:29] [John] And that's the really interesting thing…honeybees are the only bees that really store honey and keep a colony going over the winter. We have others, we call them social insects that all work together, where you have a queen and workers and drones, you know, different caste like that, like the bumblebee. But the bumblebee colony only lives one year and that queen bumblebee, she comes out in the spring and she gathers pollen and nectar and then she has to start from scratch just to find a place to make a colony and then she has to make the wax and she has to lay the eggs and then she keeps those eggs warm by vibrating over them. So she incubates them like a mother hen would and then after about a month or so, then those eggs hatch and become workers and then that queen bumblebee can stay in the hive and the workers go out. And then at the end of the summer, that queen lays eggs that are going to be males and females and they go out

and mate and then the males all die and then those new queens are the ones they are going to start colonies the next year. So they don't keep honey stores. [00:09:28] Honeybees are the only ones that really do that…. keep a colony going year after year after year.

[00:09:33] [Jane] So our next question is from Bellamy who lives in Sharon, Vermont.

[Bellamy] I'm 4 years old and [00:09:39] I wonder how bees make a bee hive.

[00:09:43] [Jane] I wonder, how do bees make a bee hive? So maybe we can open up and you can show me.

[John] Yeah, the honeybees, they're what we call cavity nesters, [00:09:50] they like to live in holes or places where they can get out of the weather so they're not going to get rained on and it's not going to be too windy and cold. So what they'll have to do is find an appropriate place where they can stay warm and dry and then they start making these unbelievable wax combs that they make out of hexagonals, so six sided figures that you've seen pictures of….[00:10:13] honeycomb… and they're the best engineers going because they build these combs that hang down and they're very strong and the bees have just the right amount of space between them and they can go in between, then they can pack them with honey and pollen and babies and pupae and all kinds of stuff that makes the hive happen. They make their own building materials. You know, they're better than humans like that. We have to like harvest wood or make bricks or something but they just make wax out of their own bodies from the honey and nectar and pollen.

[00:10:44] [Jane] It's pretty amazing. I mean, looking at what bees can do and these, as you said, perfectly shaped hexagons and they're not using tools, they just know how to do it.

[John] Yeah.

[00:10:54] [Jane] All right, so you want to open up the hive?

[John] Yeah. So a little, just a little puff of smoke in the front there. [00:11:01] That's where the guard bees like to hang out so we want to let them know, OK, hey, maybe there's a forest fire, go eat honey!

[Jane] And we're not bears.

[John] We're not bears. We're wearing white, we're good guys.

[Jane] You really think the bees know that if you're in white you're not a bear, you think that they can differentiate?

[00:11:15] [John] I think they are keyed into color. So some of their natural enemies are things like bears and skunks, so things that are dark colored, that they're going to be more aggressive towards. So I think when we're wearing white, it just gives them a signal; maybe they can't see us as well but we're also not a bear or a skunk. So I'm just taking the cover off the top.

[Jane] I'm going to put my microphone right next to the hive so you can all hear these bees.

[John] Now we don't need a lot of smoke but with just a little smoke in here we can push them down. [Voice trails off as he lowers his head} We can pull up one of these frames here and see what they've been doing.[00:11:52] So these are new frames we just put in, not too long ago, maybe a couple of weeks ago.

[Jane] So a frame….

[John] A frame is a rectangle of wood that has a little piece of plastic in the middle with the outline of honeycomb and then the bees build that out. They put wax on it and build it out. So what I'm looking at here is to see how well they've done building that out and they're doing pretty good. And you can see they're already putting nectar in there. These are all girls here except for there's a drone, that's the boy bee.

[Jane] All the worker bees are female.

[John] Yup, they're all females.

[Jane] And just one queen per hive.

[John] Just one queen per hive, yup. [00:12:32] They can make new queens if the queen's getting old and not doing a great job laying eggs. Then the "hive mind", the bees I'll figure out together, that they are going to make a new queen and they start making a queen cell and feeding royal jelly to the little larva that hatches in there and that gives it like superpowers to become a queen.

[Annika] My name is Annika and I'm 6 years old. I live in [00:12:54] San Diego and my question is "How do bees make honey and why?".

[00:13:03] [Owen] My name is Owen, I live in Pennsylvania. My age is 5. My question is "How do bees collect nectar?".

[00:13:13] [Jane] So the bees are collecting pollen and they're collecting nectar but neither of those things are honey. So how do the bees take the nectar and make honey?

[00:13:22] [John] OK, so the nectar's in the flower, right? So they're [the bees] going up and they have [00:13:28] a mouth part that's kind of like a straw, I guess you could call it. They lap up the nectar. Then they've got a crop inside their mouth. It's like a little sack that will carry fluid, liquid- like nectar, and then they bring that back to the hive and they kind of pass it around and put it in the cells, the little honeycombs, and they dry it down. So they have to dry it down. So honey is really concentrated nectar. [00:13:53] It takes SO many trips with the bee going back and forth collecting nectar just to get a teaspoon of honey. It's amazing.

[00:13:59] [Jane] So nectar is basically just watered down honey. And what they're doing is concentrating, getting that liquid, getting the water out of the nectar to turn it into honey and that's what honey is, that we eat.

[00:14:09] [John] Yeah, it's the sweet liquid that the flower's offering as a reward for the bee for visiting and then the bees turn that…. some people say it's like bee puke. [John laughs.]

[00:14:19] They're vomiting it back up, but we're trying to market honey here so we don't use that term.

[Jane] And with the pollen, you can see sometimes bees are carrying pollen on the backs of their legs. They don't turn that into honey.

[00:14:29] [John] No, they use that. So pollen is like protein; it's the building block of animal bodies so they use that to feed their young, mostly.

[00:14:38] [Jane] Alright. But a lot of kids and adults are a little bit afraid of bees and that's mostly, I think only, because they worry about getting stung and getting stung hurts. It doesn't feel good. So we have a bunch of questions about stinging that maybe you can help us answer.

[00:14:52] [Mirabelle] Hi, my name is Mirabelle. I live inColorado. I'm 4. Why do bees have stingers?

[Greer] Hi. My name is Greer. I am 10 years old and I live in Pittsburgh, Pennsylvania. [00:15:06] My question is "Why do bees die when they sting you?".

[00:15:12] [Blake] My name is Blake. I'm from Pittsburgh, Pennsylvania. I'm 6 years old and my question is "Why do bee stings hurt?".

[00:15:22] [John] I mean, the whole idea of a bee sting is a really cool thing. [00:15:26] It's a way for the bees to protect their honey and their hive and their brood. You know, because those animals are coming in. They hunt skunks, they want to eat bees. They'll come scratch on the door at night and the bees will come out to see what's happening and the skunks will scoop them up by the handful and eat them up. Or a bear will come in and the bears like to eat the baby bees, the little fat chunky larvae, and they also, I'm sure, think a little honey dip on the side is pretty good. But so…. the bees, they've got all this honey and, in nature, everything is food for something else. Bees have figured out this way to protect themselves and because they all are in a colony, and we have like, you know, 30 to 50,000 bees in a colony, they can sting. [00:16:08] And the sting is…. it's really their egg laying device that's called an ovipositor, that's adapted to being a nasty little stinger. And it's got all this stuff going on for it. It's got barbs, you know, like little hooks on it so that when it goes in you it stays in you. And that's one of the reasons the bees die, it's because they fly away and they pull out. It pulls out of their abdomen, their bottom part, and it leaves a little sack that has venom in it. So it's got this poison and it's got a muscle around it that keeps pumping. So if you think like a little bulb with a bqrbed point and it's pumping poison into you, it is a really amazing adaptation. So they sting mainly to protect their honey and their colony. [00:16:51] But even now, you can see I'm here, I don't have any gloves on. I've got my hands right in with the bees and stuff, so they're not so aggressive. And then when they're out foraging for nectar and pollen and flowers, they're so busy doing that, that they're not going to go after you. If you come close to their hive, that's when you're going to maybe get into some trouble. But usually, unless you step on them with your bare foot or you brush against the flower, they're not going to sting you. So you can go out, you can get right up close and watch them and don't be afraid. But sometimes on rainy, cold days they're in a bad mood, too. They're kind of like us, they can get grumpy. Today's a nice, sunny, warm day and we've got them open and they don't even care. [00:17:28] Some people believe that being stung is good for you. There's a thing called apitherapy where the bee venom is considered to be medicinal. So

for people like me, [00:17:37] who get old, stiff fingers and stuff it might be good to get stung by bees once in a while. So I don't I really don't mind it too much.

[00:17:44] [Lily] My name is Lily. I live in Georgia and my question is “Do wasps and things that sting, have to try to sting or is it just that they can touch their stinger to something and it just happened automatically?”.

[00:18:00] [Jane] Do they just sting you because their stinger brushes against you or do they have to think, “I'm going to sting that guy, I’m going to sting that kid, I want to hurt him!”.

[00:18:07] [John] I don't think they're just trying to sting to hurt you. They're stinging because they're afraid of you. They think you're trying to cause them some harm. So it's just basically a misunderstanding unless, of course, you're trying to swat the wasp or something. Then it's justified.

[Jane] And then they're doing it for good reason.

[John] But wasps don't have barbed stingers like honeybees have. So they can they can sting you and they can sting multiple times and they can decide how much venom to put into a sting. They have a lot more control than just [stinging when] you rub up against them and stuff. The interesting other thing about wasps versus bees is bees are great pollinators mostly because they're searching for pollen for food and they're so fuzzy that they carry the pollen around by accident or on purpose so they can bring it back to the hive. But wasps don't have as much hair. So a lot of times, people get stung by wasps and say they got stung by a bee. Especially like yellow jackets, they look like bees, they're black and yellow and they sting. Wasps are meat eaters so they feed their babies caterpillars and other things that they catch around. So they can be really good for us farmers because they're helping us with our pest management because caterpillars like to eat my apples and stuff. So we like the wasps around too. So we welcome them, but we stay away from them because they're a little meaner than bees.

[00:19:26] [Jane] That kind of answers a question we got just as we were putting this episode together.

[00:19:34] [James] My name is James and I live in Marion, Iowa and I want to ask a question. What's the difference between a wasp and a bee and a mosquito?

[Jane] Wasps and bees and mosquitoes, oh my! [00:19:49] Well, James. John just told us that one difference between wasps and bees is that wasps are meat eaters. Some wasps you might have heard of hornets and yellow jackets. Wasps have smooth bodies while bees are fuzzy and wasps can sting more than once while honeybees, at least, can only sting once because they have a hook at the end of their stinger. So the end of their body stays stuck in whatever they’ve stung. Bumblebees can sting more than once but they're not usually very aggressive. Now, bees build nests out of wax. Wasps chew up pulp leaves and stuff to make a papery nest out of their own saliva. Bees and wasps are both members of the family of insects known as “hymenoptera”. Now, mosquitoes are also insects but they're pretty different. I'm guessing you're thinking of them together because mosquitoes can cause you some itchiness or pain, too. Well, while bees eat pollen and nectar and wasps eat caterpillars and spiders and things like that, mosquitoes eat us! We are their food source because they suck our blood to get their energy. Let's get back to bees. Here's Charlotte.

[00:21:05] [Charlotte] Hi, my name is Charlotte and I'm 5 years old and I want to know how do people get honey out of beehives without getting stung?

[00:21:17] [Jane] She says "How do people get honey out of beehives without getting stung?". Part of it is wearing these bee suits, right?

[00:21:25] [John] Yeah, these help and sometimes you do get stung getting the honey out, so the way I do it is I pick up one of those frames that's full and is capped, you know, it's finished honey,
[00:21:32] it's all dried to the right consistency that it is going to be good honey and be able to store for a long, long time. Once the whole frame is capped, [00:21:43] I take it and I have to brush those bees off. So I brush them off. I have a fancy little bee brush that's very soft and gentle and I knock them back into the hive.They don't like that. I usually get stung when I'm not paying attention to where I put my fingers and my hands and I squish a bee by accident. So I try to move slowly and be very kind of meditative around the bees. But they can tell if you're nervous and anxious, too. Like I'm not nervous now so they're not bothering me but if I was going like this [makes noises and shakes like a really nervous person] they might be more antsy. Like horses… horses are like that, too. You know, if you're calm around them, they're calm around you.

[Jane] Well, and you can tell, as you said, they sound different. When they're mad,
[00:22:23] when they start to get mad, they buzz in a different way. It sounds different than when they're happily just buzzing around their hive. You can tell when a bee is mad at you.

[00:22:30] [John] Yeah, and sometimes if you're working on a hive for a few minutes and you've been in it and you've torn it all apart looking for honey and whatever you can tell when they're starting to get fed up and then you move faster.

[00:22:40] [Jane] You mentioned apitherapy, it's a bee sting therapy, but we've got another question.

[00:22:45] [Sylvia] Hi, my name is Sylvia. I live in Brooklyn, New York. I'm eight years old. And my question is "Is it true that honey makes cuts heal and makes you feel better when you're sick?".

[00:22:53] [Jane] Is it true that honey makes cuts heal and makes you feel better when you're sick?

[00:22:57] [John] Honey is awesome. Not only does it taste good but I know when I have a sore throat in the winter, if I start getting a sore throat, we have an elderberry honey ginger syrup that we take. [00:23:09] Or sometimes I just put honey in hot water with a little lemon and it makes me feel better immediately. So I don't know if there's good clinical doctors having studied that, but it makes me feel better and it makes a lot of people in the world feel better as well. People usually go to honey as something for a sore throat, for sure. The other thing about honey that's really cool is that in the olden days they used to use it for cuts and wounds like during World War I and lot of people were getting hurt and they didn't have antibiotics to keep the germs away, [00:23:40] they'd need to put honey on it because germs can't live in honey. It's a very magical material. So it kills germs. [laughs]
[00:23:49] So yeah, if you get honey and you get a cut you could put some honey on it. But don't go around the bees, they might come after you….

[Jane] Or the bears. Or the skunk.

[John] ….to get their honey back.

[00:23:58] [Jane] What do you like about being a beekeeper?

[00:24:01] [John] You know one of the things…..so the kids are asking a lot about stinging. I like having to overcome that fear of being stung. I mean, when I first started I was afraid to get stung.
[00:24:11] And now I'm sticking my hands in there and it's just like a challenge to work calmly when you know any second you could get hurt and you wouldn't know when it was going to happen. So that's really kind of fun. And then I just I love the honey. We make an elderberry ginger honey syrup that we sell so the honey is an important part of our farm business. And I'm a biologist so the biology is fascinating to me. I'm an entomologist by training, so that means I study insects and so I've always been interested in insects a whole lot. So, to have an insect that you can play around with and it gives you stuff that you can make a living off of is really fun for me.

[00:24:54] [Jane] We left the beehives and took off our bee suits because we were really sweaty and we walked over to John's raspberry patch.

[00:25:02] [John] So here we are in my raspberry hoop house which is a big plastic greenhouse.
[some laughing]

[00:25:14] [Jane] [phew] Alright, so here we are in your raspberry hoop house.

[John] So this is the raspberry hoop house. So we grow raspberries under these big plastic hoops mainly to keep the rain off them but also, in the springtime, if it gets really cold and we're going to get a frost, we can lower the sides and keep it keep it warmer in here.
[00:25:30] And the same thing in the fall, so we can extend our season and get raspberries longer that way. [00:25:35] And you can see they really like it here. They're about seven or eight feet tall…

[Jane] They're beautiful.

[John] ….and loaded with berries and they're flowering, and you can maybe hear the bees buzzing and you can see all the different species that are helping us out. So these are our partners, all these different bees. The honeybees are our partners, [00:25:51] so we take care of them. The bumblebees are our partners so we take care of them and we give them lots of food. We plant special flowers and bushes and trees that they're going to like and we provide nesting habitat for these bees, too, we make lots of nooks and crannies and piles of wood and bales of hay and things for them to nest in because, without them…no bees, no fruit; no fruit, no fruit farmers; no pie! So we really need these bees.

[00:26:22] [Jane] But if we have honeybees and we've learned how to kind of farm them, sort of, they're still wild but we help them along, and they can pollinate our fruits and flowers and you said sometimes these other bees are better at it in bad weather, but why do we need 275 species? Do we….I mean, bees sting us! Shouldn't we just kill all the rest of them off?

[00:26:42] [John] Why do we need them? You should ask the bee, the individual bee. They'd probably say "Why do we need people?". The honeybees need us, but the other bees…. so we need ecological diversity of bees, we need lots of different things because everything is connected to everything else. [00:27:00] So, if we lose the bees that pollinate our wildflowers then our wildflowers die, and then, you know, all natural systems can be weaker because of that. So we need all those bees and we should protect them. And they're in trouble, too. I mean, you've probably heard that honeybees are having difficulties these days because of things like pesticides and mites and diseases and loss of flowering habitat. And climate change, even. So, but honeybees have beekeepers. [00:27:31] They've got people like you and me who take care of them but nobody's taking care of those native bees, so we should be really worried about that. And so when we say "Save the bees.", we should be thinking about saving those native bees.

[00:27:42] [Jane] That was John Hayden at The Farm Between in Jeffersonville, Vermont. Thanks, John. [00:27:47] Let's take a minute for some musical celebration of pollinators and honeybees. Get up and dance, if you can.

[00:28:00] [Mr. Chris singing song from beginning of show]

Hello little Pollinator, Hello little Honey Bee
Do you like the taste of flowers early in the morning
Goodbye little pollinator goodbye little honey bee

I didn't catch your name for faster than you came
Quick away you flew; you've got a job to do, don't you?
You know you do it well, I'll tell you I can tell
Just by looking round, the colors are profoundly beautiful

Oh honey bee, where would I be without you?

Hello little Pollinator, Hello little Honey Bee
Do you like the taste of sunshine early in the morning
Goodbye little pollinator goodbye little honey bee

I didn't catch your name for faster than you came
Quick away you flew; you've got a job to do, don't you?
You know you do it well, I'll tell you I can tell
Just by looking round, the colors are profoundly beautiful

Oh honey bee, where would I be without you?
Oh honey bee, where would I be without you?

[00:30:23] [Jane] That was Vermont musician, Mr. Chris. The song "Honey Bee" and more Mr. Chris songs are going to be featured in an upcoming children's television pilot from Vermont PBS. It's called "Mr. Chris and Friends" and it will be released on air and online in November. As we're learning today, bees are really important because of their role as pollinators. They fly from flower to flower collecting nectar and pollen and when they travel around, they spread that pollen from one plant to another and that's how plants make more little plants, by combining the pollen from other plants with their own and creating new seeds. We talked more about pollination in our episode called "How Do Big Plants Grow From Such Small Seeds?". So if you want to learn more about pollination you should check out that episode. Almost all of our flowering plants and the crops that we eat rely on

pollinators and it's not just honeybees. Other kinds of bees, butterflies, hummingbirds, some flies and beetles and even some bats are pollinators. We reached out to one curious kid who is so interested in pollinators that he's working hard to make sure they stay alive.

[Kader] My name is Kader Narayan, I'm eight years old and I live in Pennsylvania. Well, a couple years back, I was going to lots of places to teach coding and now I have a five month old brother
[00:31:50] and so my mom and my dad can't go to those places. So I was looking for something fun to do over the summer and I learned about gardening. And I also learned that the bumble bee is an endangered species now. So I saw that the local extension was doing lots of pollinator gardening so I decided to do that too. And that's also when I realized how wasteful lawns were.

[00:32:19] [Jane] Lawns are wasteful because that grass isn't really something that the animals, at least the pollinators, can eat. So if we have just one big yard full of grass that we keep cutting down, it's not a very good food source for a lot of our native plants and animals, and it's not really a good habitat for those animals either. They can't hide in short grass if you're mowing it all the time. Now, Kader was entering a contest called "The Paradigm Challenge" where kids use technology to change the world. The challenge was to find a way to reduce waste. So Kader thought he could pair technology with his newfound interest in gardening and pollinators.

[00:32:59] [Kader] My mom told me about the pollinators and how they are in danger and so we decided to make an app to teach people about pollinating gardening. [00:33:07] It also tells you information about pollinators. It gives you a simple design template for your garden [to do] some projects for pollinators. It tells you about everything from plants and even lets you play games and go to native plant nurseries.

[Jane] Kader says he's learned that planting flowers and plants that are native or come from your own region is a really helpful thing for the plants and animals that live around you.

[Kader] We just keep on growing lawns and nothing else. We don't grow our native plants which are common to the given area and, next, we put herbicides on our lawns. So what happens is that it just stops any native plants from growing. Also, did you know that lawns are like deserts, biological deserts, to pollinators? They provide no food, water or shelter. But what we can do for our pollinators to help is that we can make bee baths and butterfly baths so that we can provide them at least a nice water source. And we can even make hummingbird feeders to feed our hummingbirds.

[00:34:17] [Jane] So Kader has created this app called "Pollinator for a Pet" that will teach you and other kids how to grow things in your yards and gardens that help those animals. It's not available yet but it will be soon on Android devices. You might be wondering how Kader knows how to make something like this that you open up on your phone and read or play games on. Kader's eight now. But he's already been doing something called "coding" for three years.

[Kader] Well, when I was five years old, I loved to play video games and my mom told me that my video games broke. But she pretended. And so we had a big fight. [Boom!] But my mom won.

[00:34:59] And she said “This isn’t the end, you can make your own video games and learn how to code.” And so I started getting really good at coding and [00:35:13] I even went and taught code to people.

[00:35:17] [Jane] Do you know what coding is? It's kind of like a language, a language that computers speak. You can tell the computer what to do using code. Lots of kids are learning how to use coding to make their own games or 3D printing or other cool things. And there are some special ways to code that are easy to learn. But Kader says it's still hard work.

[Kader] It takes a lot time and effort. The app is over a thousand lines of code.

[Jane] All of Kader Narayan hard work paid off. He was one of the winners for his age group in that Paradigm Challenge he entered. Thank you so much for talking with us, Kader.

Well, that's all for today. Now, if you have a question about anything, have an adult record an audio file and send it to questions@butwhykids.org. [00:36:06] It's easy to do on a smartphone using a memo function. But if speaking is difficult for you, you can e-mail your question instead.[00:36:14] We'll do our best to get an answer for you. But Why is produced by Melody Bodette and me, Jane Lindholm at Vermont Public Radio. Our theme music is by Luke Reynolds. [00:36:25] We'll be back in two weeks. Until then, stay curious.