

But Why: A Podcast for Curious Kids

Who doesn't love ice cream?

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Jane 00:21

This is But Why: A Podcast for Curious Kids. I'm the host of the show Jane Lindholm. I make this program with Melody Bodette at Vermont Public, and we put out a new episode every two weeks. On But Why, you get to ask the questions and we find answers. We have so so many questions from so so many of you from so so many different parts of the world! And we are always impressed by all the ways you're curious about the world around you. Sometimes you're even curious about the treats you like to eat.

Charlie 00:54

My name is Charlie, and I'm four and a half and I'm from Virginia, and how do you make ice cream?

Nora 01:06

My name is Nora. I'm four years old. And I'm from Virginia.

Prishan 01:17

My name is Prishan and I'm 11 years old. I live in London, England, and my question is: how do you make different flavors of ice cream?

Remy 01:27

My name is Remy. I am four and a half years old and I live in Brooklyn, New York, and my question is: why is ice cream cold?

Rita 01:39

Hello But Why. My name is Rita. I am five years old. I live in Novosibirsk, Russia.

Liam 01:50

Hi, my name is Liam. My age is seven. Where I live is US, Florida.

Suri 01:58

My name is Suri and I'm five years old and I live in Houston, Texas.

Hannah 02:07

My name is Hannah and I'm four years old. I live in California. I want to know why does ice cream melt?

Jane 02:17

Even when your questions are about, oh say ice cream, which is what we're obviously talking about today, our answers teach us things about chemistry and food science, about culture and history, and about how people choose their careers. And sometimes we answer all of your questions once and we like them so much we want to hear the whole episode again!

Jane 02:39

A few years ago, we spoke with Rabia Kamara, the chef and co owner of an ice cream shop called Ruby Scoops in Richmond, Virginia, here in the United States. Rabia says she decided to make a career in ice cream when she started thinking about being an adult who needs to have a job, and how to have a job that feels like fun. At least most of the time.

Rabia 03:00

I realized that I was gonna spend the rest of my life working and I wanted it to be something that I enjoyed doing. So I went to culinary school and we learned how to make ice cream, like in a machine. It was a small machine, but I really enjoyed the process and the different things that you could add to it, and fell in love with it and just decided that if I was going to do something for myself long term, I wanted it to be ice cream, because I, from my childhood, even now into an adult have a lot of fond memories that include ice cream. And I wanted to be a part of that for families and friends and people that I know and don't know, and to, you know, hold a special place in their heart through ice cream.

Jane 03:39

What makes your ice cream special?

Rabia 03:41

Well, first things first, it's delicious, although most ice cream is. But we make it all by hand, so it's all small batch. We can't make more than like four gallons at a time because of the machine that we have. We do vegetarian, gluten-free, vegan, we are working on some sugar free. So we're doing our best to make sure that we can accommodate everybody's lifestyles or dietary restrictions and still provide you with a nice cool, sweet treat. And then ownership-wise we are black, woman and queer-owned.

Jane 04:11

What kind of edge does that give you that another shop might not have?

Rabia 04:14

For us, it's very important that we make people feel safe and inclusive and accepted. Because these are things that we've both had issues with throughout our own lives. We want everybody to be able to come into the shop, no matter what they look like, identify as, or who they--you know, whatever they're going through, we want them to feel safe to come and enjoy, you know, an ice cream cookie with themselves or whatever/whomever they desire and feel like that space is theirs while they're there.

Jane 04:45

Well, that's cool, because everybody should be able to enjoy ice cream.

Rabia 04:48

Absolutely. Absolutely. That's exactly how we feel.

Jane 04:52

It's also the way a lot of our young listeners feel so let's hear some of your questions.

Charlotte 04:57

Hello. Hi, I'm Charlotte. I live in Australia, Newcastle, and I'm five years old and I want to learn how to make ice cream.

Yula 05:08

My name is Yula. I'm eight years old and I'm from Nova Scotia, Canada. And I'm wondering, how does milk turn into ice cream?

Yula 05:16

Hi, my name is Mae. And I'm four years old. And my question is how is ice cream made?

Jane 05:21

Ice and cream sounds like it's just cold cream, but there's a little more to it. So what is ice cream?

Rabia 05:28

So ice cream is defined as a frozen dairy dessert that basically has air like incorporated into it while it's freezing, because while the air...So the base of it is usually heavy cream milk, sometimes egg yolks, not always egg yolks, sugar, and then whatever your flavorings are going to be. So we basically heat all those things up together, bring them to a point where all of our raw ingredients become safe to eat, cool it down and then put it into a machine, which we will refer to as a batch freezer, that we we turn on, there's a cylinder on the inside so that ice cream is spinning as it's getting cold. So while we incorporate that air, that ice, into the cream, if you will, you get basically this fluffy, creamy product, because when you mix cold and air and milk, you get that texture that we all know as ice cream.

Jane 06:31

If it didn't spin around, if you didn't get the air into it, would it just be like a block of ice?

Rabia 06:36

To a sense. So what I was gonna say is if you don't put the air into it, things that we also know: popsicles if you've ever had like a fudgecicle, which is icy but still cold, that is what would happen if you didn't pump that air into it. So that, if you want to sound fancy, we refer to that freezing as quiescently frozen. So quiescently frozen basically freezes in like a period of inactivity. So there's nothing going on. When we make popsicles at home, we put juice into a mold, we put stick in it, put it in the freezer.

Jane 06:38

Don't touch it.

Rabia 06:48

Don't touch it. With ice cream, you got to touch the base, because you gotta have to get the air into it. And that is what really the big difference is between ice cream and like a dairy frozen dessert, or a popsicle or like a novelty. You can also make things that are ice cream texture out of non-dairy milks: cashew, coconut almond. But you cannot legally call those things ice cream. You can do the same thing, but it would be called a non-dairy frozen dessert.

Jane 07:41

That's a boring, more boring name.

Rabia 07:43

Such a non-exciting name. So you know we try to find fun names for it to make it not as long to say what you really want to eat.

Jane 07:49

So ice cream kind of is just icy cream plus some sugar and additional flavorings. But what makes it ice cream instead of a popsicle or a fudgecicle is stirring air into the mixture either before it freezes or while it's freezing. So it's not just a block of frozen cream. All that air creates lightness and fluffiness and texture.

Molly 08:13

Hi, my name is Molly and I live in New York and I'm six years old. And my But Why question is: but why does the sun melt ice cream?

Emily 08:23

My name is Emily and I am six years old. And I live in New Jersey. And my question is: why does ice cream melt in the sun?

William 08:37

Hello, my name is William and we live in Philadelphia, Pennsylvania, and I'm five. And my question is: why does ice cream melt?

Charlotte 08:49

Hi, my name is Charlotte. I live in New York City and I'm four and a half. And I am wondering...and my question is, why does ice cream melt?

Jane 09:02

Ice cream melts because it's frozen. In order to stay frozen, the air around the ice cream has to be really cold. If you could walk inside a freezer, like maybe if you are wearing snow pants and a jacket and gloves, you could sit there eating your ice cream and it would never melt--as long as your warm hands weren't touching it and warming it up. But unless you like eating your ice cream in cold winter weather, the air around you is probably warmer than the ice cream whenever you're eating ice cream. And that warm air hits the cold ice cream and the cold ice cream starts to get drippy.

Jane 09:38

Technically, the ice cream is absorbing the energy around it in the form of heat. Now we've talked about this in previous episodes and how things turn from something that's frozen to something that's liquid and then to something that's a gas, depending on how warm it gets or how cold it gets. But basically, molecules move more slowly when they're cold than when they're warm. So the ice cream feels solid and cold because the molecules in that cream and sugar mixture are moving way more slowly when they're frozen. But when the ice cream starts to absorb the energy in the warm air, the molecules start to move faster, and they turn back into a liquid. And what that means for you is that you've got some melty ice cream on your hands.

Julia 10:27

Hi, my name is Julia, and I am six years old. And I want to know how was ice cream kept cold before freezers?

Jane 10:36

Most of us these days have a freezer inside our homes where we can keep ice and ice cream and frozen food. But freezers are a pretty recent invention. In fact, the modern refrigerator didn't appear until about a hundred years ago. And it's been even less than a hundred years since people started having modern freezers that use chemicals and electricity in their homes. But people have been able to keep food cold for much longer than that, although not everyone had that ability to do it in their own homes. Now, if you think about it, obviously snow and ice and cold temperatures will keep things cold. So people who lived in cold climates have been able to use their natural surroundings to keep food cold. Even for people who didn't live in that cold environment, they were able to use ice to keep food and other things cold. So people would take ice, say from a frozen lake, and transport it to a place that was warmer. But then they'd have to try to keep the ice from melting. So they'd do things like bury the ice underground where it's a little bit cooler, and then cover it with hay. This was done to insulate the ice from the heat so to try to keep the cold in and the heat out. In some cases, ice could be kept all summer that way.

Jane 11:56

And your great grandparents might have had something in their home that they called an icebox. This was kind of an early version of a fridge or a freezer. It was usually a wooden box lined on the inside with some kind of metal. The ice would be delivered in blocks to people's homes. The iceman or the ice deliverer would come to your house and drop off some ice, and you'd slide the ice inside the ice box. And then that ice could stay frozen, but melting really slowly, for maybe up to a week. There would be a second compartment in the icebox where you could put your food and keep the food cold as the ice melted. And then when the ice was fully melted, you'd have another block of ice delivered. And that way you could keep your food cold. So people were able to keep ice cream cold before they had freezers by using an ice box or storing it in a cold environment. And you could even make ice cream without having a freezer. When I was a kid, we sometimes made ice cream using a special ice cream maker that my grandfather had. It was a really big wooden bucket, kind of looked like a barrel. And inside the wooden barrel, you would put a lot of ice and some salt. And the salt would help lower the temperature even further. The salt and the ice surrounded a special container, a cylinder, in the center of the bucket where you would put your cream and your sugar and whatever else you were using to make your ice cream. And then you had to use a crank to spin that container round and round to get

that air into the ice cream. It seemed like it took a long time, like maybe an hour. I mean it felt like even more to me as a kid. But eventually that cream and sugar spinning and spinning and spinning would start to freeze and the air would be in it and it would suddenly turn into ice cream. And then it was, oh my gosh, so exciting to eat because you had used up so many of your muscles just trying to get it to turn into ice cream. But these days you don't have to work nearly so hard to make your own ice cream. And when we come back, Rabia is going to tell us how to do it the easy way, without needing to spin or churn anything.

Jane 14:06

This is But Why: A Podcast for Curious Kids. I'm Jane Lindholm and today we're learning about ice cream: what it is and how to make it. Rabia Kamara of Ruby Scoops Ice Cream, is teaching us the importance of air in the making of ice cream. Sometimes that means churning or spinning the ice cream as it freezes. But you can do it a much simpler way, with just a couple of ingredients, in the comfort of your own home.

Rabia 14:34

You need three ingredients, specifically, and I make it at home all the time because I love ice cream and sometimes I want to eat in the house. So we basically take two cups of heavy whipping cream, one 14-ounce can of sweetened condensed milk and then your flavorings. So if you wanted to do vanilla ice cream, you could put a couple of teaspoons of vanilla in there. You could put melted chocolate. You could put peanut butter, strawberry jam, you could put whatever flavor ice cream you've got in mind into this.

Jane 15:08

Here in Vermont, we have a lot of blueberry bushes coming up with fresh blueberries right now.

Rabia 15:12

So if you are putting fruit in ice cream, you basically want to cook it down in sugar or use it from a jam or preserve. Because if you put raw fruit into something, that is going to, as we said, quiescently freeze because there's no air incorporated into it. So it'll make your ice cream or your fold-ins icy, which isn't very fun. It took me a couple of tries of making strawberry ice cream to figure out what needed to be done, actually. So if you were doing that, you could basically just take one cup of fruit to 1/3 cup of sugar. You could add lemon juice if you wanted, if you like a little brightness in your jams. Cook that down. Let it cool. And then you could add that as your flavoring if we were going to be making a Vermont blueberry ice cream.

Jane 15:56

Got it. Okay, so we have our ingredients.

Rabia 15:59

Yes, so we have our two cups of whipping cream and our one can of condensed milk. We're going to put those into a mixing bowl. And then we're going to use an electric hand mixer. If you don't have one, a whisk is fine; it's just gonna take a long time. But that's how we get our muscles, that works. So you just want to put those two ingredients into a bowl and you want to mix it until it looks like whipped

cream. You want to be able to pull your mixer out of the bowl, and the whipped cream still sticks to your attachment. And if you've got it like that, then you can add whatever flavorings you want, in this case, your blueberry mix that we made, swirl that into your ice cream. And then you're just going to basically take your ice cream and put them into some freezer safe containers. I like to use things that are rectangular or square because they freeze in a nice layer. And then they're they're easier to scoop out of than something that's round. So we put that in our container, put a lid on our container, into the freezer for at least eight hours. And voila, we've got homemade ice cream, just as easy as that!

Jane 17:03

That's so cool. So you're basically doing that--putting the air into it before you freeze it when you make it at home. Whereas for you, when you're making it, it sounds like you've got a container that's spinning while it freezes. So you're putting the air into it while it freezes. So what's the difference in the texture or the way that ice cream feels and tastes?

Rabia 17:24

The texture is actually very similar. And it's the flavor that you want to make. So it's you know, it's exactly what you want, technically.

Jane 17:32

So if you wanted like a gummy bear peanut butter chocolate chip ice cream, you could make that.

Rabia 17:37

Absolutely.

Liam 17:40

Hi my name is Liam. I'm four years old. I live here in central California. My question is why do some ice creams melt faster?

Jane 17:52

That's Liam who's asking why do some ice creams melt faster than others?

Rabia 17:57

Some ice cream melts faster than others based on how much air there is in the product and how much sugar there is in the product, so--and fat. So if you're eating like a super premium ice cream, let's say Ben and Jerry's, and we get a scoop of Ben and Jerry's and then we get a scoop of Breyers. They use different fats in their dairy. So that's one thing. And that also helps with the perception of the cold that we get, different levels of dairy content and different levels of sugar. So the more air there is in your ice cream, the faster it will melt.

Jane 18:37

I am excited to learn that because sometimes even if you have two different kinds of ice cream from the same company, when you take them out of the freezer one is softer than the other and one melts faster than the other even though it's the same kind, same brand of ice cream. So that's neat to know.

Rabia 18:54

Even I will say chocolate ice cream always melts faster than vanilla ice cream, because there's more sugar in it because chocolate is bitter. And we like our chocolate with sugar. So the more sugar you add to something, the quicker it melts. Like a popsicle will melt faster than ice cream, because there's no fat. So yeah, it would be fun to take out two flavors from the same company and get like get, like one chocolate, one vanilla and something with some mix ins and see that your vanilla will probably melt the slowest.

Jane 19:24

You know, it's pretty cool that your job is making ice cream. But you're actually kind of a scientist too, because you have to learn the chemistry.

Rabia 19:31

And it's really interesting because my whole life I thought I wasn't really into like chemistry and parts of science. But being so involved in ice cream has made me realize that I'm more of a chemist than I thought. Just like knowing what needs to go into things to make sure that it comes out right and I'm like, Oh, I might be a scientist after all.

Jane 19:53

A scientist and a mathematician because you got to know your measurements.

Rabia 19:56

Exactly! All the things that when I was in school, I was like I'm not going to use this everyday, I genuinely use every day. So you don't think you're going to use math all the time. Sorry to tell you, that is not true.

Jane 20:10

All right, so here's another kind of scientific question for you, kind of half science, half food knowledge. The question comes from three and a half year old Robin in England, who wants to know why is lemon-flavored sorbet white, and not yellow?

Rabia 20:26

A couple of things here. And the first thing is that, well the first thing we've been talking about most of this episode is: air. So when we incorporate air into something that is frozen, not quiescently but like an ice cream is, it changes the color of what you're making. Whatever you put into the machine will come out lighter. So, for instance, vanilla ice cream is white, as we know it. But the base for vanilla ice cream, because it's got egg yolks in it, is yellow. So when you put that into a machine and you add the air, it comes out lighter and paler. So lemon juice is yellow, but it's a really pale yellow. It's not the same as like the skin that we see on, the yellow that's really bright. So when we take that pale yellow lemon juice and sugar and water and mix it all up and put it into a machine that pumps air into it, what's going to come out is this basically like clean white, whiter than vanilla ice cream product, because all that air going into it is going to make it lighter in color and in texture.

Jane 21:33

And sorbet is different from ice cream technically, right?

Rabia 21:37

Sorbet has no dairy or fat in it whatsoever. It's typically blended fruit, sometimes some lemon or lime or orange juice, water and sugar. Now, sherbet...

Jane 21:53

Oh yeah, tell me about sherbet.

Rabia 21:55

Sherbet is kind if ice cream and sorbet had a baby. So sherbet usually has two to five percent dairy, which is either going to be milk, cream or buttermilk. I personally like to use buttermilk in my sherbets because it adds a nice tanginess to usually whatever we're making. But all three of them are frozen the same way where they're put into a machine, into the hopper, and a cylinder moves a certain direction, typically clockwise, and pumps in air as it freezes.

Jane 22:25

So even sorbet is frozen like ice cream with air pumped into it.

Rabia 22:29

Yes it is! All three: ice cream, sherbet and sorbet are all made the same way. It is not, I wouldn't say it's impossible, but it is a little harder to make sorbet at home. Because there isn't any dairy, you can't add the air first. So it's something that basically you have to, like, freeze cubes of fruit mix and put it into a food processor or excuse me food processor or blender to add air or you have to go in and like scrape it constantly to add the air by hand.

Jane 23:01

You mentioned that you can't call it ice cream, but you can make something similar with similar texture and flavors without dairy. So if people want to make stuff at home that doesn't have dairy, is it the same process?

Rabia 23:13

It would be similar. You would have to use like a coconut whipping cream which I know they sell in most grocery stores now, non-dairy whipping cream. And you could use condensed coconut milk. Or you could use cream of coconut. Or if you can find like the vegan or excuse me a non-dairy evaporated type of milk like a shelf-stable milk, you could add your own sugar to it and create your own condensed milk to use.

Jane 23:38

So even people with dietary restrictions can make good treats at home.

Rabia 23:42

And they can still make cookies and cream because Oreos are vegan.

Jane 23:47

So, Rabia, is there anything else that you think we should know about ice cream that you think is super cool?

Rabia 23:54

I think it's super cool that you can make any flavor your heart desires. And I don't feel like you can always play those games with other foods. You could make a savory ice cream if you really wanted to make, you know, like a blue cheese ice cream or...yeah, I'm with you. I'm with you, Jane.

Jane 24:10

You can't see me but I just made a face like "Ooh, not sure I want that."

Rabia 24:14

I've seen people make like savory ice cream. So you could even you know you could do like a like a cheddar cornbread ice cream. You know, you could you could make, like you said earlier, gummy worms and chocolate chips and peanut butter. You could...it's such a blank slate that you can add any flavor to. And because it's so easy to make at home, it's a really fun way to experiment and see what kind of flavor combinations you like. So I think that that's super-exciting. And I think that ice cream connects us all because every country, every culture has their type of ice cream or frozen dessert. And I think we all come to love it from such a young age, that it's exciting. It's exciting to talk to people about ice cream and know that we're all eating it all over the world.

Jane 24:59

That's Rabia Kamara of Ruby Scoops. Thanks Rabia, for giving us such a great taste of what it's like to be an ice cream entrepreneur, a business owner, and for teaching us how to make our own ice cream. We'll end up with a question from Avi.

Avi 25:13

I'm seven years old. I live in Philadelphia, Pennsylvania. And my question is, is there anybody in the world who doesn't like ice cream?

Jane 25:26

I'm sure there's someone out there who doesn't like ice cream. But one of the coolest things about it is how ice cream can be changed to work for just about anyone's preferences or dietary restrictions. And if you weren't writing it down when Rabia shared her easy ice cream recipe, don't worry. We have it in our show notes. And while there are lots of ways to make ice cream, we really liked how this recipe can be made with just a hand mixer, no ice cream maker needed. Send us a picture or a note and tell us about what kind of flavor you decide to make. I like making mint ice cream from my garden mint. And last year I even tried a basil version. It was pretty good actually. But Why is produced by Melody Bodette and me, Jane Lindholm, at Vermont Public and we're distributed by PRX. Our theme music is by Luke Reynolds. We'll be back in two weeks with an all new episode. Until then, stay curious.