Podcast**:** Imagine This

Episode Title: How are thunder and lightning made?

Duration: 12’ 49”

[ABC Kids podcast sting – This is an ABC podcast]

*[Triumphant classical music starts]*

**Nij**: Hello, my name is Nij and today on Imagine This, we’re cloud gazing…

**Kid 1:** Over there! … It looks like a rabbit … No, a bear … It’s fluffy

**Nij**: Yeah, and how about that one!

**Kid 2:** It looks like a mouse … No, it’s got a trunk! … Yeah, looks like an elephant … See, it has a big trunk – that’s an elephant.

**Nij**: Hmm what about that one over there, it looks a bit grey and rumbly.

**Kid 1:** It’s a storm cloud, it looks very black, full of big heavy rain … Yes, it will be a big thunderstorm … They’re storm clouds

**Nij**: Yeah, I think you’re right, it does look like a storm cloud, and that’s what today’s question is all about…

**Kid 2:** Hi I’m Astrid and I’m 5 years old and I want to know how is thunder and lightning caused?

**Nij**: Do you think that grey cloud over there is a thunderstorm?

*[Low rumbling thunder]*

**Kid 1:** Yes! … Yeah … It will be a big thunderstorm

**Nij**: Hm I don’t know how thunder and lightning gets made. Do you?

**Kid 2:** I think there’s like drums in the sky and then it just bangs itself … maybe the sun goes into the clouds and that’s the lightning flashes

*[Classical music finishes with a rumble of thunder. A breeze blows through long grass, insects chirping]*

**Nij**: You know what, I think we better ask a meteorologist

**Kid 1:** Meteorologist?

**Nij**: That’s a weather expert and…

**Nate**: *(his voice echoing from afar)* Hey! Nij!

**Nij**: Where’s that voice coming from?

**Kid 2:** Over there!

**Nate**: *(echoing)* It’s me! Nate!

*[Quick footsteps through grass as Nate jogs over]*

**Kid 1:** Hello … Hello!

**Nij**: Right on time

**Nate**: What can I say, I just blew in on the breeze

*[Breeze through the grass]*

**Nij:** This is Nate Byrne he’s a meteorologist.

**Kid 2:** A weather expert!

**Nij**: Nate, can you help us with our weather question? We’re wondering how clouds like that big one over there, can make thunder and lightning?

**Nate:** Ah yeah, looks like a storm front is rolling in. Hey before it gets here, can you tell me, all the ingredients we might need to make clouds?

**Kid 1:** I think they’re made out of white, fluffy things and they have water inside them … When its heaps of wind, all the wind joins together and makes a big, fluffy thing … It could be the pressure in the sky

**Nate**: That’s right, to make a cloud you need to take air and push it high into the sky. Air might feel dry but it’s actually full of invisible water. When you take all that invisible water into the sky, where it’s much, much colder…

**Kid 2:** Cold … Freeeeezing cold!

**Nate:** Yep, once it gets that cold, the water doesn’t want to be invisible anymore, it wants to turn into a water droplet.

**Nij**: Is that rain?

**Nate:** It’s not rain yet. It’s still too small. All these itty-bitty drops of water hang out together and, from down here, they look to us like big fluffy clouds.

**Nij**: Okay so we know about those fluffy white clouds above us, but what about that grey one over there?

**Kid 1:** They might have lots of water and they’re drooping to let it go

**Nate**: The only difference is that that grey one is a lot bigger and has a lot more water in it so the sun can’t shine through.

**Nij**: Does more water in the cloud mean it’s going to rain?

**Nate**: Yes, it can!

**Kid 2:** And it makes lightning too?

**Nate**: Ah, there’s more to lightning and thunder than just a soggy rain cloud but we’ll have to use our imaginations for that part.

**Kid 1:** Yesss!

**Nij**: I thought you’d never ask!

**Nate**: But first, let’s put on our storm suits!

*[Zippers zip and buckles click. Storm suits beep online]*

**Nij/Kid 2:** Ready!

**Nate**: Alright, everyone ready for the next updraft? Here it comes! Aim for that grey cloud.

**Nate/Nij/Kid:** Three, two one! Goooo!

*[Blast off! High powered thrusters launch Nij, Nate and the kids into the storm. They land inside a wet and windy cloud]*

**Nij**: Woah it’s crazy in here

**Nate**: Yeah, you might need your windscreen wipers in here, it’s pretty wet!

*[Squeak of wipers]*

**Nij:** And windy

**Kid 2:** It’s so noisy … It’s so wet and swirly … What? I can’t hear you. It’s too loud and windy!

*[Gust of wind blow, and rains swirls around]*

**Nate**: Inside a cloud lots of things are happening all at once. For starters, it’s like a washing machine in here! It’s all churny and swirly.

*[Classical music starts as rain drops bump into each other]*

**Nate:** Tiny drops of water are whizzing around and bumping into each other and when that happens, they join together to make bigger, fatter drops, until they’re too heavy to stay in the sky…

**KID**: It’s starting to rain!

**Nate**: … and they fall out of the bottom of a cloud as rain

*[Rain gets heavier]*

**Nij**: Wow look below us, the rains falling out! But this cloud feels like it’s getting bigger. If it rains, won’t it lose all the water and disappear?

**Nate**: In a small rain cloud, yes, that’s exactly what happens. If it rains a lot, the cloud will shrink and shrink and disappear.

*[Rain stops as music ends with a flourish]*

**Nate:** But some storm clouds get really big

**Kid 1:** How big?

**Nate**: Really, *really* big! They can go up 10kms into the sky. That’s like 100 football fields all in a row, but straight up.

**Kid 2:** Oh, that is so far … My goodness! … Is that how big it is?

**Nate:** They are massive!

*[Gusts of wind blow]*

**Nij**: Can we go to the top and have a look?

**Nate**: For sure! 10 kms is a pretty long way though. Let’s turn on our storm suit thrusters to zoom us up.

*[Flick, click, beep, blast off! Nij, Nate and the kids land in the frozen top of the cloud. Creaking, ice crystals chime and knock into each other]*

**Nij**: Holy moly, it’s freezing up here!

**Kid 1:** Brrrrrr … This is cold! … Ice cold!

**Nate**: Yes, up here, the temperature is below freezing. It’s where all that rainwater becomes ice

**Kid 2:** Hail comes when it’s heaps of ice in the sky … I think some of the water gets frozen up and then it comes down like hail

**Nate**: Yup, ice falls from the sky as hail but up here in a cloud, it helps create lightning!

**Kid 1:** Really? How does it do that?

**Nate**: That’s true, not all storm clouds fling out hail, but all storm clouds do have ice in them, from here all the way up to the very top. Let’s get up there where it’s not so noisy!

*[Crunching and smashing bits of ice banging into each other]*

**Nate**: Did you hear all that crashing and knocking around? That’s all the bits of ice bashing into each other. All that bumping around knocks off a really small, but important thing, called an electron.

*[Electrical sizzle as exciting classical music starts]*

**Kid 2:** Electron? Sounds like electric … It sounds like electricity

**Nate**: Spot on – yes, electricity makes our lights work or anything that’s plugged in.

**Kid 1:** Like a camera or a computer

*[Beeps of camera and computer starting up]*

**Nate:** That electricity is like a river of electrons flowing through the wires. It’s safe cos it can’t get out of the wires, and we use it for power. But up here in a storm cloud, electrons are getting knocked around and flying loose, and *they* become lightning.

**Kid 2:** Wow … It’s like there’s a light in the cloud? … Why don’t they just stay here in the cloud?

**Nate**: Well, electrons don’t like to stay together. When they get mixed around in a cloud, groups of them can get together by accident

**Electron 1:** Oh, it’s you again

**Electron 2**: Ugh and you

**Nate**: When that happens all they want to do is go to a place with no electrons

**Electron 1:** I just need some me time

**Electron 2**: leave me alone

**Electron 3**: I just feel so crowded

**Nate**: As more and more electrons get thrown together, they pull towards a place with a lot fewer electrons. The pull gets stronger and stronger until finally –

*[Big musical ending with a crack of lightning]*

**Nate**: They make the jump! And that is lightning.

**Kid 1:** I think that’s pretty cool

*[Rainfall and gentle winds]*

**Nij**: Wow, so that’s what’s going on! But hang on, if they don’t like each other so much, why isn’t lightning jumping out of the clouds all the time?

**Nate**: They need to be close to the spot they want to move to, almost touching. So, in a cloud, the lightning, the big surge of electrons, can go towards the nearest empty spot – usually that’s inside the cloud, or another cloud that’s passing by. If there’s a big enough charge built up, a big group of electrons is strong enough to jump down from the cloud all the way to the ground.

**Electron 1:** Oh, looks lovely over there

**Electron 2**: Cya!

**Kid 2:** Crash boom!

**Kid 1:** What about thunder?

**Nate**: Ah, well, that’s just the sound of lightning. Let’s get out of this cloud. It’s much easier to hear from the ground.

*[Storm suit thrusters ignite as Nij, Nate and the kids zoom down to the ground. It’s raining softly]*

**Nate**: Lightning creates a big flash of light and a big sound too – we call the sound thunder. The sound is made by the air getting heated up super-duper hot. It expands really quickly, like the lightning is saying, ‘Move it, I’m coming through!’ and pushes the air out of the way. But lightning doesn’t hang around for long, does it?

**Kid 2:** No, it’s like a flash!

**Nate**: Exactly, so once it’s gone, the air comes rushing back in

**Kid 1:** And it bounces back

*[Nate claps his hands at the same time there is a thunderclap]*

**Nate:** Just like a big clap.

**Nij**: A thunderclap! That makes sense

**Kid 2:** But sometimes it doesn’t sound like a clap

**Nate**: Remember when you saw me earlier, I called out to you, but you weren’t sure exactly where I was. The sound of my voice was bouncing around

**Nij**: Yeah, we couldn’t tell where you were. It sounded like you were coming from lots of different directions

**Nate**: Sound loves to move around and bounce off things. You might hear thunder that sounds like one big bang, or you could hear a rumble --

*[Long rumble of thunder]*

**Nate:** --as the sound is bouncing off hills or mountains or buildings and houses. You’re not just hearing one thunderclap – you’re hearing all the echoes of one too.

**Kid 1:** Like an echo it goes echo echo echo

**Nij**: So, if you hear really rumbly thunder, is it further away than if you hear one big loud clap?

**Nate**: A good way to tell is if you count between when you see the lightning and hear the thunder. If it happens at the same time, the storm cloud is really close. And if it happens a long time after each other, its further away. But you know the best way to tell what’s happening with a storm?

**Nij**: What?

**Nate**: The weather report! Meteorologists like me can tell you all about the weather in your area and how to keep safe if there’s a big storm coming.

*[The rain stops and birds start to sing in the distance]*

**Nij**: Ah the sun’s come out

**Nate**: Hey now the storm is all cleared up, I have to go grab my gumboots. There are puddles to be splashed in!

*[Splash of water as the kids squeal and laugh]*

**Nij:** So, Astrid, every storm cloud is made of water….

*[Classical music starts]*

**Nij:** It gets bigger and bigger…

*[A gust of wind]*

**Kid 2:** 100 footy fields big!

**Nij:** Until the top of the cloud begins to freeze, and ice begins to swirl and crash around.

*[Ice breaks and shatters and crashes into more ice]*

All this crashing and banging knocks loose tiny bits of electricity called electrons…

*[Electrical sizzle]*

that want nothing more, than to get away from each other.

**Electron 1:** I just need some me time

**Nij:** A bolt of lightning is what happens when a group of electrons jumps to a place that has room for them to spread out.

**Electron 1:** Cya!

**Nij:** And thunder is the sound of that lightning bolt. It can sound like a sharp clap if it’s really close by

*[Sharp clap of thunder]*

Or it can sound like a low rumble if it’s far away, and the noise of the clap is echoing for miles around

*[Low rumble of thunder]*

If you get nervous in a thunderstorm, the best thing to do is stay inside and check the weather report. And don’t worry, cos once the storm is over

*[Bird song chimes through the music]*

We can spot rainbows and splash in puddles

*[Puddle splash and music ends]*

**Nij:** Imagine This is an ABC Kids listen podcast hosted by me, Dr Niraj Lal. A big thanks to ABC meteorologist Nate Byrne, and to all the kids who helped make the podcast. Today’s episode was written and produced by Soumia Bella, and was made on Gadubanud, Wurundjeri and Gadigal lands. Our engineer is Que Nguyen and senior producer is Emma Gibbs. For more great podcasts to play, music to move, and stories & soundtracks to sleep, download the ABC Kids listen App, free from your app store.