Podcast**:** Imagine This

Episode Title: How does a caterpillar turn into a butterfly in its cocoon?

Duration: 14’ 16”

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

*[Pleasant classical music]*

**Nij:** Hello, my name is Nij, and today on Imagine This, I’m making… a sandwich!

*[Fridge opening, items clatter together in the door]*

**Nij:** I’ve got my fresh bread – mmm!

*[Cutting through loaf]*

**Nij:** And a big red tomato

*[Chopping tomato]*

**Kid 1:** Oh, that looks nice

*[Tomato squish]*

**Nij:** So juicy! A lovely head of lettuce straight from the garden

*[Lettuce leaves tearing]*

and… hey! There are holes in my lettuce! Who’s been making them?

**Kid 2:** A caterpillar ate some leaves

**Nij:** Uh of course! A very hungry caterpillar. Look at all the holes in my lettuce

**Kid 1:** They’ve got a very big appetite

**Kid 2:** Well, all they eat is plants

**Nij:** Why do you think it’s so hungry?

**Kid 1:** Because they want to get fat so they can turn into the butterfly, and they won’t be hungry in the cocoon

**Kid 2:** It builds itself a cocoon…

**Kid 1:** The caterpillar sleeps and sleeps, then it turns into a butterfly

**Kid 2:** and then when it hatches out of the cocoon, it turns into a butterfly

**Nij:** How?

**Kid 1:** You think it’s magic but it’s really not because it’s kind of like a kid turning into a grown up and a grown up is different to a kid and that’s how a caterpillar is different to a butterfly

**Nij:** Today’s question comes from Hugo and Amelia

**Kid 2:** How does a caterpillar turn into a butterfly?

**Nij:** And Josh has been wondering…

**Kid 1:** Why does a caterpillar make a chrysalis?

**Nij:** Hmm cocoons… Chrysalises… What’s the difference?

**Kid 2:** Um, well, ah, yes, and, I don’t know

**Nij:** I don’t know either, let’s ask Professor MYRON Zalucki

**Kid 1:** Who’s that?

**Kid 2:** A butterfly doctor?

**Nij:** Kinda yeah – he’s a lepidopterist - a butterfly expert. Come on, let’s find him

*[Music flourish]*

*[Transition to outdoor garden. Bees buzzing, light breeze, birds calling in distance]*

**Kid 1:** We’re on a farm!

**Kid 2:** No, it’s a veggie garden

**Nij:** Aw yum, look at all the fruits and veggies growing

**Kid 1:** I can see strawberries

**Kid 2:** Cabbages

**Kid 1:** Lots of flowers

**Kid 2:** I grow tomatoes

**Nij:** Oh look, there’s Myron, crouching near that corn. Hello!

**Myron:** Ssshhh!

**Nij:** *(whispering)* Hi Myron!

**Kid 1:** Hi

**Kid 2:** Hello

**Kid 1:** *(shouting)* Hello!

*[Kids giggle quietly]*

**Kid 2:** What are you doing?

**Myron:** I’m watching an egg hatch. Here on this milkweed leaf.

**Kid 1:** What is that?

**Myron:** Watch and see

*[Egg starts wriggling and rustling]*

**Nij:** It’s such a tiny little egg

**Kid 2:** It’s so small

**Nij:** Even smaller than an ant

**Myron:** Yes, this one was probably laid by a monarch butterfly several days ago.

**Kid 1:** and now we’re waiting for the eggs to hatch

*[Egg cracks open]*

**Kid 2:** Oh, here we go!

**Nij:** It’s starting to wriggle

**Kid 1:** Ooh they’re hatching now!

**Nij:** The egg’s popped open

**Kid 2:** It’s moving

**Nij:** And there’s a little caterpillar inside

**Myron:** Only about the size of a long grain of rice

**Nij:** I didn’t expect them to be so cute. *(laughing)* It’s pretty cute really!

*[Caterpillar starts munching on leaf]*

**Nij:** Aw look at it go. Myron, can you help us with a question? We want to know…

**Kid 1:** How does a caterpillar turn into a butterfly?

**Nij:** Yeah, and what’s a chrysalis?

**Myron:** Ah well, there are a few things that need to happen before these little critters can turn into something new…. But it’s easier if we use our imaginations

**Nij:** Oh good, this caterpillar is so small my eyes are getting sore!

**Myron:** We’ll get a much clearer view of things at their level. But human feet aren’t very good at sticking to plants

**Kid 2:** *(laughing)* No

**Myron:** How about we turn into ladybugs instead?

**Nij:** Yeah, then we can fly!

**Kid 1:** Yeah!

*[Magical sounds as the group transforms]*

**Nij:** Alright are you ready? Let’s turn red

**Kid 1:** Red and black

**Kid 2:** And spotty!

**Myron:** We’ll need 6 legs

**Kid 1:** and wings!

*[Fluttering vibration of ladybugs wings and whooshes as they fly away]*

*[Bright classical music plays]*

**Nij:** We’re flying!

**Kid 2:** Everything’s so big now

**Kid 1:** Big and so big and giant

**Nij:** That corn cob looks like a building!

**Kid 1:** Because the ladybugs are so small

**Nij:** Wow there’s so much green everywhere! It’s like this veggie patch just turned into a jungle

**Myron:** Let’s land down on that leaf. We can follow this little caterpillar on its journey to becoming a butterfly

*[Whoosh as classical music ends]*

*[Helicoptering down to leaf]*

*[Loud crunch as caterpillar begins to eat its egg]*

**Kid 2:** It’s eating the egg!

**Nij:** Don’t do that, it’s gross

*[Kids and Myron laugh]*

**Myron:** It’s their first meal! They won’t stop eating for the rest of their caterpillar lives

*[Crunching and munching ]*

**Nij:** I don’t think I’ve ever been that hungry

**Kid 1:** *(laughing)* Never!

**Nij:** What are they gonna eat after they’ve finished their egg?

**Myron:** Well, a butterfly mum will usually lay her eggs on something a baby caterpillar can eat. So, once they hatch, they can get straight to eating. It’s really their one job. Eat and grow and moult.

**Kid 2:** Only three things!

**Myron:** Okay I guess that’s three jobs

**Kid 2:** Doesn’t go to caterpillar school

*[Kids and Myron laugh]*

**Kid 1:** It’s so hungry

*[Crunch crunch crunch]*

**Myron:** Let’s fly over to that other leaf. We might be able to spot a bigger caterpillar, one that’s closer to becoming a butterfly than this little fella.

*[Breeze, wings, whoosh as music ends]*

**Kid 2:** There’s one! Over there!

**Nij:** Woah, it’s much bigger than the baby caterpillar. How old is this one?

**Myron:** It depends on the type of butterfly they become, but most caterpillars live for two or three weeks. They eat and eat, and their bodies get bigger and bigger until their skin doesn’t fit anymore, and they need to get rid of it

**Kid 1:** Whaaat?

**Myron:** It’s not as gross as it sounds. A caterpillar’s skin is like a sleeping bag that it’s living in.

*[Eating and zipper sounds]*

It’ll eat and grow until the sleeping bag becomes stretched tight and doesn’t fit anymore. But, instead of taking the sleeping bag off when it gets too big, the caterpillar grows an even bigger sleeping bag, underneath the old one. Then it wiggles out of the old, tight sleeping bag, and is wearing the new one with more room to grow

**Nij:** Myron, I think that is as gross as it sounds!

**Kid 2:** Yeah, it is

*[Myron and kids laughing]*

**Myron:** It’s called moulting. Lots of animals do it

**Kid 1:** Moulting

**Kid 2:** Snakes shed their skin

**Nij:** Yeah, and you find cicada shells everywhere too

**Kid 1:** It growed new skin

**Myron:** A caterpillar will moult four or five times in its life.

**Kid 2:** Woah

**Nij:** And then it becomes a butterfly?

**Myron:** Not quite. Something really incredible happens first. C’mon

*[Whoosh, flying, landing in a still area]*

**Nij:** This is a nice spot. We’re out of the breeze and we’re nicely hidden away in the leaves

**Myron:** The perfect place for a caterpillar to become a butterfly!

**Kid 1:** Where?!

**Myron:** Right here

*[Gentle harp music plays]*

See this hard, green thing hanging from the leaf. It looks a little like a peanut shell but smooth all over

**Kid 2:** It looks like a lead trying to camouflage

**Kid 1:** Yeah, it does

**Nij:** Is that a cocoon?

**Kid 2:** That’s not a cocoon!

**Myron:** No, I like to call it a chrysalis, but you could call it a pupa.

*[Birds call in distance]*

This is the last shape a caterpillar will take. It is the stage between being a caterpillar and becoming a caterpillar or moth. When it wriggled out of its last layer of skin, this is what was underneath. The caterpillar attached itself first to a leaf or a stem of a plant, shed the old bag and then the chrysalis hardened into a tough shell.

**Nij:** Woah so the chrysalis *is* the caterpillar? It’s not something it made?

**Myron:** Some caterpillars will *make* one – they can use their sticky silk or wrap up in a leaf – that’s when we call it a cocoon. Most moth pupae are made inside cocoons. But butterflies are made inside an exposed pupa or chrysalis. It’s the special last sleeping bag that the caterpillar makes.

*[Harp music ends]*

**Kid 1:** So, it’s turning into a butterfly now

**Kid 2:** Inside the chrysalis

**Myron:** Well, you know, it’s *always* been a butterfly on the inside. Right from that first moment, when we saw the baby caterpillar wiggling out of the egg, it carried something very special inside it.

*[Bright, optimistic classical music]*

**Nij:** What?

**Myron:** A special groups of cells called imaginal discs.

**Kid 2:** Imaginal discs?

**Kid 1:** Sounds like, imagine this!

*[Nij and Myron laugh]*

**Myron:** Yes! They are the special cells that will build the adult butterfly

**Kids and Nij:** How?

**Myron:** When a caterpillar first hatches from the egg, these little imaginal cells are sleeping. As the caterpillar grows bigger, the cells start to wake up. When the caterpillar is ready, the cells will begin their transformation

**Kid 1:** What are imaginal discs?

**Kid 2:** What are they gonna do?

**Myron:** They’re very small bundles of cells that are ready to grow into a butterfly’s body parts.

**Kid 2:** Wing and antennas

**Kid 1:** Legs

**Kid 2:** A heart

**Kid 1:** Definitely a butt

*[Myron and kids laugh]*

**Nij:** So, what’s happening inside the chrysalis now?

**Myron:** Caterpillar soup –

**Kid 2:** Ew!

*[Squishy wet sound]*

**Nij:** Gross

**Myron:** *(laughing)* Everything inside the chrysalis – or for moth’s, everything inside the pupa in the cocoon - turns into liquid. Everything *except* for the imaginal discs.

**Kid 1:** Wow imaginal disc

**Myron:** The caterpillar’s body breaks down completely and the imaginal discs will grow into the butterfly parts, and connect together inside the chrysalis

**Nij:** Ah I always thought it grew wings onto a caterpillar body

**Myron:** Nope

**Kid 2:** Really?

**Myron:** It’s an entirely new animal

**Kid 1:** Woah!

**Kid 2:** How long does it take?

**Myron:** About two weeks depending on the temperature. When the butterfly is ready. It’s time to come out

*[Chrysalis starts to quiver]*

**Kid 1:** It’s moving!

**Kid 2:** It’s coming out

**Myron:** Ah, the chrysalis is splitting open to reveal a beautiful butterfly!

*[Angelic tones as chrysalis opens and wings start to flutter]*

**Kid 1:** The wings are opening!

**Myron:** Yes

**Kid 2:** They look like beautiful

**Myron:** They’re much smaller and bundled up inside the chrysalis so now it’s pumping blood into the veins – the dark lines on the wing – to open them up.

*[Wings flutter under heartbeat]*

**Nij:** Its pumping up like tyres

**Myron:** They’re a bit soft at the moment but once the wings harden, the butterfly will fly off to find some lovely flowers.

*[Plucky classical music starts]*

**Kid 1:** They’re collecting pollen! And those butterflies are licking the flowers to find something to eat

**Kid 2:** Do butterflies do the same thing as bees?

**Kid 1:** Pollinate!

**Myron:** Yes, butterflies are definitely good pollinators but if you ask me, moths are way more important!

**Nij:** Moths? Really?

**Myron:** There are just so many more moths than there are butterflies. And we rely on them every single day.

**Kid 1:** What do you mean?

**Myron:** Well, moths and butterflies have evolved for millions and millions of years. They’ve had a long time on Earth to develop some really special relationships with flowers and plants – especially the fruits and veggies you love

**Nij:** *(Gasp)* my lettuce!

**Myron:** By visiting all those flowers and carrying pollen to and fro, pollinators help plants set seed. So, all our lovely butterflies, moths, flies, beetles and bees, are the reason we have so many yummy things to put on our sandwiches.

**Kid 2:** Wow

**Kid 1:** Cool!

*[Song ends]*

**Myron:** It might just mean you get the occasional visitor in your lettuce

**Nij:** Wow, thanks for taking us on such an amazing journey, Myron. This ladybug needs some lunch.

**Myron:** I saw some lovely looking white flies on the strawberries over there, c’mon!

*[Whoosh of insect wings taking off]*

*[Classical music starts]*

**Nij:** So, Amelia, Hugo and Josh, a butterfly begins its life as a teeny egg on a leaf,

where it hatches into a tiny caterpillar

*[Kids munching]*

From its first day out of the egg, it starts to eat

*[More munching]*

And grow

And eats and grows

Until it becomes too big for its skin

and has to wiggle out of it

**Kid 1:** Moulting!

**Nij:** Caterpillars grow their new skin *underneath* the old one

*[Zipping sleeping bag]*

And they’ll moult their skin four or five times as they grow

*[Zip zip zip]*

A caterpillar carries within it all the things it needs to become a butterfly

**Kid 2:** Imaginal discs

**Nij:** And when the time comes, these special cells wake up

**Kid 1:** *(Yawning)* Time to become a butterfly

**Nij:** And its skin hardens into a chrysalis

Inside the chrysalis, the caterpillar breaks down

**Kid 2:** Caterpillar soup!

**Nij:** And the special cells start to build the butterfly

**Kid 1:** Wing

**Kid 2:** The head

**Kid 1:** Antenna

**Kid 2:** The feet

**Nij:** When it’s ready, the butterfly will break free from the chrysalis, spread its wings, and spend its days sipping nectar from flowers. Until it’s time to make its own egg on a new leaf.

*[Classical music resolved under the sound of a insects and birds in a garden]*

**Nij:** Imagine This is an ABC Kids listen podcast, hosted by my Dr Niraj Lal. A big thanks to Professor Myron Zalucki from the University of Queensland and all the kids on the show. Today’s episode was recorded on the Gadigal, Wurundjeri, Turrbal, Kaurna, Dharug and Garigal Nations. Written and produced by Soumia Bella with sound design by Que Ngyuen, our senior producer is Emma Gibbs. For more great podcasts to play, music to move, and stories and soundtracks for sleep, download the ABC Kids listen app. Free from your app store