Podcast**:** Imagine This

Episode Title: How is paper made from trees?

Duration: 11’ 57”

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

*[Light classical music starts]*

**Nij:** Hello, I’m Nij and today on Imagine This, we’ve got our crayons and pencils out

*[Nij shakes a fresh sheet of paper]*

**Kid 1:** We’re drawing!

*[Pens and pencils scratching on paper]*

I’d like to draw, hmm, a surfboard … I’m drawing big bamboo trees, with a rainbow

**Nij:** I’m gonna draw a koala! With big grey ears

*[More drawing]*

**Kid 2:** Oh, that looks nice

**Nij:** Oh no, I made a mistake, better start again

*[Nij scrunches up paper, grabs a new sheet and starts scribbling]*

**Nij:** Hmm that’s not quite right either

*[Nij scrunches up the paper]*

**Kid 1:** You’re using too much! … You have to use paper, not do a drawing and then scrunch it up and put it in the bin … You didn’t really draw that much … And that’s called wasting paper

**Nij:** Yeah, I think you’re right. We had a question about paper….

**Kid 2:** Hi I’m Molly and I’m 7 years old and I want to know how paper is made from trees?

**Nij:** How is this -

*[Shaking paper]*

- made from a big, tall tree?

**Kid 1:** Squish ‘em? … They chop it down and then smoosh the tree down … So first you grow a seed, then it grows into a tree, and it has paper on it … You rip paper bark … I think when you rub a bit of bark, the paper stuff comes out

**Nij:** How do they get it so thin?

**Kid 2:** They maybe put it in a machine, and it squeezes it into a rectangle … They put it through a flattener … and you press the buttons then it turns into paper

**Nij:** I think we better talk to my friend Peter

**Kid 1:** Who’s that?

**Nij:** Peter Kanowski is a Professor of Forestry

**Kid 2:** Professor of the *forest*!?

**Nij:** Yep, forestry is the science of planting forests and looking after them. And I bet I know where we can find him.

**Kid 1:** In the forest?

**Nij:** Ah, well… yeah.

**Kid 2:** *giggle*

*[Classical music end as Nij and the kids enter a forest. Birds are calling from the trees and there is a light breeze with insects chirping]*

**Nij:** Wow, there are so many trees here

**Kid 1:** I can see tree trunks lined up … they’re in straight rows and lines and they have really thin stems

**Nij:** Yeah, they go on and on. Hellooooooooo!

**Peter:** Hello!

**Nij:** Ah! Peter, hi! I didn’t see you there. I guess I couldn’t see the *forester* for the trees!

**Peter:** *laugh*

**Kid 2:** Hi Professor Kanowski! ... Hello!

**Peter:** Hey kids, welcome to the Green Triangle! One of Australia’s biggest plantation forest regions.

**Kid 1:** What’s a tree plantation?

**Peter:** Well, just like farms have herds of cows, or rows of corn, or fields of wheat. This is a crop of trees

**Kid 2:** It’s like a tree farm!

**Nij:** Peter, we came to ask you how paper is made from trees

**Kid 1:** Do you chop them all down? … With an axe

**Nij:** Or a chainsaw?

**Peter:** It would take a really long time to cut these down with an axe or a chainsaw. So, we bring in some friends…

*[Harvester engine revs and honks horn as music starts]*

**Peter:** This is a harvester

*[Trees are felled as the harvester uses a circular saw]*

**Kid 2:** They’re chopping down a tree! And chopping it all up

**Peter:** It’s an amazing machine hey. It has claw hands that can grab the tree around the trunk, and a sharp saw at the bottom for cutting close to the ground. And then it uses that long flexible arm to place them on the ground in a neat pile

**Nij:** Look at it go! It’s holding a whole tree like it’s a twig!

**Peter:** Yes, they’re very powerful

*[Harvester fells a last tree before coming to a stop with another toot of the horn. Music ends with the engine]*

**Kid 1:** What happens to all the animals?

**Peter:** That is an excellent question. We don’t want to hurt any animals by chopping down trees. And lots of different animals live in forests. So, we have a few steps to keep them safe.

*[Gentle piano music starts]*

**Kid 2:** I would say shoo shoo shoo … Get out of the way! Harvester coming!

**Nij:** *laugh*

**Peter:** Well, yes, sort of! These machines are very noisy. So, when they hear us, the kangaroos will hop away

*[Kangaroo hops]*

The wombats will waddle off, and the birds will fly away too

*[Flock of birds flies away]*

We have to be extra careful of the slower animals – like koalas. If we can see they’re living in the trees, we won’t cut the trees down.

**Kid 1:** Good

**Nij:** Do you get them down with koala treats?

**Kid 2:** Or you could look up with your binoculars to see a koala … You can follow the track of the koala poo

**Peter:** Or we can look for the scratch marks from the koala’s claws

**Kid 1:** Cool

**Peter:** We make sure we leave lots of trees around the plantation for the animals to keep using

*[Harvester drives past]*

**Nij:** What’s that harvester doing now?

*[Harvester takes leaves and branches off the trunks in long, single movements]*

**Peter:** After it’s cut down the tree, itcuts off all the branches and leaves so all that’s left is the big trunk, and then a machine called a forwarder picks them all up, and loads them onto trucks, ready for the sawmill.

*[Harvest honks its horn twice]*

**Nij:** To turn into paper!

**Kid 2:** No, they’re not. They’re gonna put it in the truck and it’ll drive to the store?

**Peter:** Not quite – there’s another step first. Come on, I’ll show you

**Nij:** Oh, but Peter, you’ve left a big mess.

**Kid 1:** Yeah, there are leaves and branches everywhere from one tree. You should clean it up

**Peter:** It’s actually really good if we leave the mess.

**Kid 2:** Huh?

**Peter:** The leaves and branches will break down

**Nij:** I know too many leaves and branches can be bad, like the fuel for bushfires. But some can be a good thing?

**Peter:** Yes, a bit like how compost helps the garden grow. It’s important that we use every single bit of the tree,

**Nij:** yeah, we don’t want to waste them.

**Peter:** So, we’ll take the wood from the trunk with us, but the rest stays here on the forest floor, to help the next trees grow. Do you want to see what happens next?

**Nij/Kid 1:** Yeah!

**Peter:** Alright, safety goggles on

*[Snap of goggles]*

**Nij:** Check!

**Peter:** Hard hats too

*[Two knocks on a plastic helmet]*

**Nij:** Check!

**Peter:** Let’s go

*[A loud saw cuts through wood as logs fall to the ground. The space is open with lots of machinery and the sound of tree trunks moving through]*

**Kid 2:** Woah!

**Nij:** The sawmill!

*[Classical music starts]*

**Kid 1:** Wow!

**Nij:** This is what an ant must feel like

**Peter:** Yes, the trunks look very different to when they’re standing tall in the forest

**Kid 2:** Yeah

**Nij:** There are so many trees moving through here

**Kid 1:** Under a machine and out of a machine

**Nij:** They’re putting the logs on a slide

**Kid 2:** Where do they go? … Wait, they’re coming out different

**Peter:** All the tree trunks get chopped up

**Kid 1:** And make it into a long square or rectangle?

**Peter:** You can get all shapes and sizes of wood cut up here.

**Nij:** What shape do you need to make paper?

**Peter:** Woodchips!

**Kid 2:** Really? How do they make it into woodchips?

The trunks get put into the chipper and they come out in lots of little pieces

**Kid 1:** Where does it go now? … Where do the woodchips go?

**Peter:** The paper mill! C’mon!

*[Music ends as a factory whistle blasts. A busy factory floor is humming with the sound of conveyor belts and machinery]*

**Peter:** Now the trees from the forest have been turned into woodchips – what do you think happens next?

*[Bright marimba music plays]*

**Nij:** They get stretched out and painted white

**Kid 2:** No

**Nij:** *laugh* nah

**Kid 1:** It might get shaped by a machine?

**Peter:** Sort of. The first step is to get all the woodchips and cook them up in a machine called a *digester*

**Kid 2:** Like in your tummy?

**Nij:** *laugh*

**Peter:** It’s a little like that – the woodchips go in

*[Woodchips are poured into digester]*

and get mixed up with water

*[Water is added]*

and chemicals and turned and churned around at a high temperature.

*[Digester starts mixing the liquid]*

When they come out, they’re not hard woodchips anymore

*[Bubbling liquid]*

**Kid 1:** I think it goes all squishy

**Peter:** It looks a bit like woodchip porridge, and we call it *pulp*

**Nij:** Well, this brown porridge doesn’t look much like paper…

**Kid 2:** How do they get it flat? And white?

**Peter:** It needs to be washed – to get all the bits of dirt and woody hard bits out. It’s still brown at this stage, so you need to add chemicals to it to make it white. Plus, a special ingredient…

**Nij:** Ooh white paint?

**Kid 1:** Toilet paper … *giggle*

**Nij:** Lemon juice?

**Peter:** Clay!

**Kid 2:** Clay? Why do they add clay to it?

**Peter:** By mixing in some clay, it makes the paper smooth by filling in all the tiny bumps and cracks. And it makes it thick and white, so you can’t see through it.

**Kid 1:** It looks like white soup

**Nij:** It’s the right colour but it still doesn’t look like paper

**Peter:** Yes, that’s true. The next step is to dry it out and flatten it in a series of big rolling pin machines

*[Rolling pin machines begin to whir and cycle through the pulp to flatten it into paper]*

**Kid 2:** Rolling pins? … They do play-dough and also cooking … Yeah, and it turns it all flat

**Peter:** Yeah! Some of the rolling pins are made of rubber, some are made of hard steel, some are heated, and some are wet, and they roll and press and roll and press the pulp until it becomes a huge, long roll of paper!

*[Marimba music ends]*

**Kid 1:** How big?

**Peter:** The roll is about 10 metres wide – that’s almost as long as a bus.

**Kid 2:** Wow

**Nij:** How much paper is that?

**Peter:** You can get up to 80km of paper on one roll! It weighs about the same as a blue whale!

**Kid 1:** Woah

**Nij:** Wow. How many trees would that be?

**Kid 2:** Lots of them

**Peter:** Thousands!

**Nij:** So now does this big roll gets chopped up and sent out to everyone?

**Peter:** Yes, it’ll get chopped into different shapes and sizes. Some might turn into the coloured paper you use at school or kindy, or some might end up in your printer at home.

**Nij:** Wow, it’s such a long journey to go on.

**Peter:** And it’s not over yet!

**Nij:** There’s more!?

**Peter:** Yes, come on!

*[Factory noise fades away and is replaced with a quiet forest]*

**Kid 1:** We’re back in the forest!

**Peter:** Back to the beginning - when we plant the trees. You see, the ones we chopped down were about 15 or 20 years old.

*[Slow classical music starts]*

**Peter:** We need to replant trees to take their place.

*[Peter digs with a shovel, loosening the soil]*

Most of them are planted by hand, right next to where we cut down the old trees. So, the plantation can start again, and a new crop of trees can grow.

**Nij:** So, in 15 years, these little trees will be ready to turn into paper?

**Peter:** Just in time for you to use when you’re all grown up!

**Kid 2:** Wow … Cool

**Nij:** I wonder if paper will still be around then. Do you think we’ll make paper from trees forever?

**Peter:** I don’t know about forever, but for now, it’s a sustainable way to make paper that we all use. The important thing is to look after the trees and animals, and make sure we’re recycling and reusing as much paper as we can, so fewer trees need to be chopped down.

**Kid 1:** Nij, you need to use all the white space on your paper!

**Nij:** I know, I know

**Kid 2:** You gotta appreciate the paper. When I wanna do drawings, I’ll draw on both sides and I’ll draw everywhere on it

**Nij:** Thanks for taking us on a paper making adventure!

**Peter:** No worries

**Kid 1:** Bye, thanks Peter … Bye … Cya!

**Nij:** Bye Peter

**Peter:** Catch ya next time.

*[Classical music starts]*

**Nij:** So, Molly, every piece paper you use today, started its journey in a forest years ago, before you were born! Once the trees get to the right size and height, they’re chopped down with a big machine called a harvester

*[Kid’s voice makes engine noises]*

The leaves and branches are left behind

**Kid 2:** Like compost!

**Nij:** And the trunks are turned into woodchips

**Kid 1:** Little bits

**Nij:** That are cooked up in a digester

*[Bubbling liquid]*

**Kid 2:** In some lovely warm water?

**Nij:** With clay and chemicals to make it smooth and white.

**Kid 1:** Like paper soup

**Nij:** Then it’s rolled and flattened,

*[Rolling pin machines hiss with steam]*

and heated and dried

**Kid 2:** Which smoothens it up

**Nij:** until it becomes writing paper.

*[Fresh sheet of paper shakes]*

It’s a big journey and it doesn’t end there. Because every piece of paper can be recycled

**Kid 1:** In the recycling bin

**Nij:** Re-used

**Kid 2:** Use the other side

**Nij:** Repurposed,

**Kid 1:** A paper airplane! … A paper airplane?

**Nij:** Reduced

**Kid 2:** Use less … Not so much

**Nij:** And even re-thought!

**Kid 1:** Maybe I don’t need a new piece

**Nij:** So that the trees planted today, *might* grow to become paper in the future. Or they might grow up to be something else

**Kid 2:** Toilet paper! … A house? … A tree!

*[Classical music ends with a bright flourish]*

**Nij:** Imagine This is an ABC Kids listen podcast hosted by me, Dr Niraj Lal. A big thanks to Professor Peter Kanowski, from the Australian National University 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, Ngunnawaland 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.