Neelu and the Phenomenal Printer

Author: Riddhi Dastidar
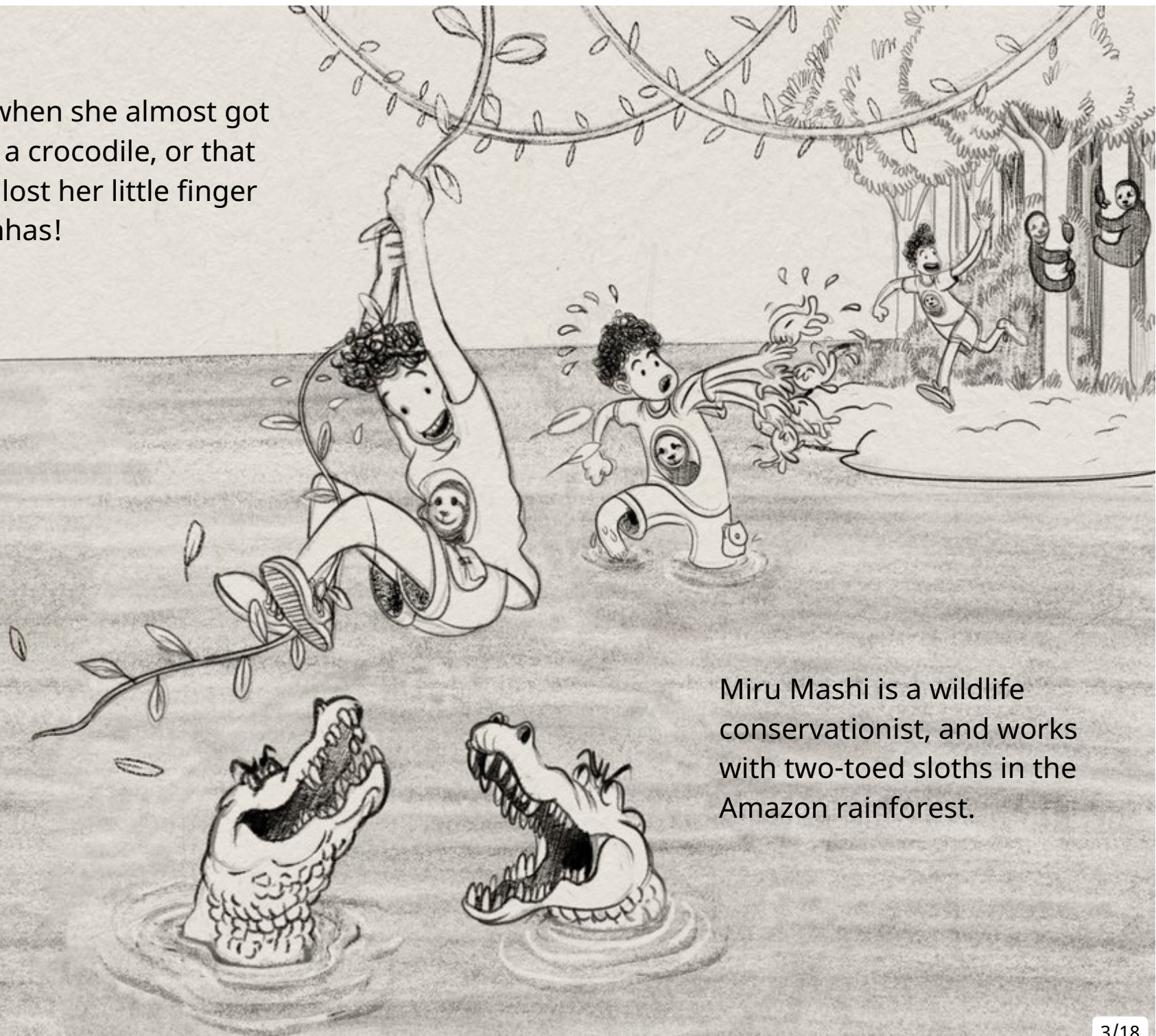**Illustrator:** Anupam Arunachalam

Level 4

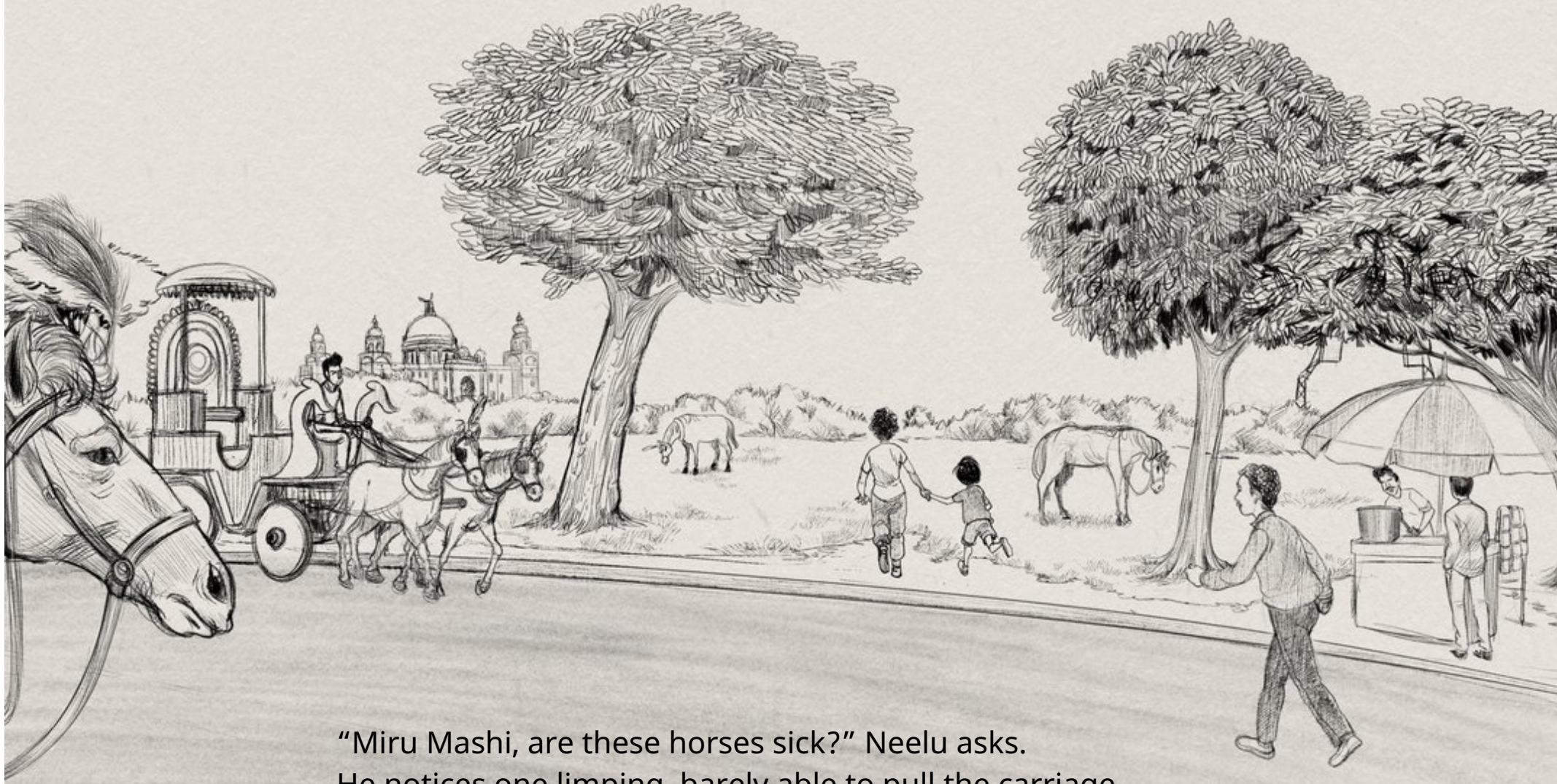Miru Mashi is visiting Neelu in Kolkata.

Neelu is thrilled.

Miru Mashi always has the strangest stories to tell.

Like that time when she almost got snapped up by a crocodile, or that other time she lost her little finger to sneaky piranhas!

Miru Mashi is a wildlife conservationist, and works with two-toed sloths in the Amazon rainforest.

The next day, Miru Mashi takes Neelu to explore the city. At the Maidan, they notice a lot of horse-drawn carriages. The horses look skinny and tired.

"Miru Mashi, are these horses sick?" Neelu asks.
He notices one limping, barely able to pull the carriage.

"These horses pull carriages for hours, and don't always get enough water or food. Many have injuries on their limbs because of the heavy load they pull.They don't get weekends off like us," Miru Mashi says.

"But what happens when a horse is severely injured?" Neelu asks.

Miru Mashi says that an injury often leads to an infection. This could lead to the limb being amputated, which means it is removed.

"After amputation, it's hard for a big animal like a horse to survive on only three limbs. This is where prosthetics can help," she says. "What is prosthetics?" Neelu asks.

Miru Mashi tells him that prosthetics is a branch of surgery concerned with making and fitting artificial body parts.

Miru Mashi tells Neelu that these days artificial limbs can be created using three-dimensional printing.

In India, this technology has only been used to help humans so far, but in Australia and the USA exciting work is happening with 3D-printed animal prosthetics.

Neelu has read about this technology online and is curious to see how it works.

Miru Mashi takes him to meet Arzoo and Salil, designers who work with a 3D printer.

"A 3D printer doesn't print on paper. It can print and create objects using different materials," says Arzoo. "Think of something," says Salil, "and we can print it!"
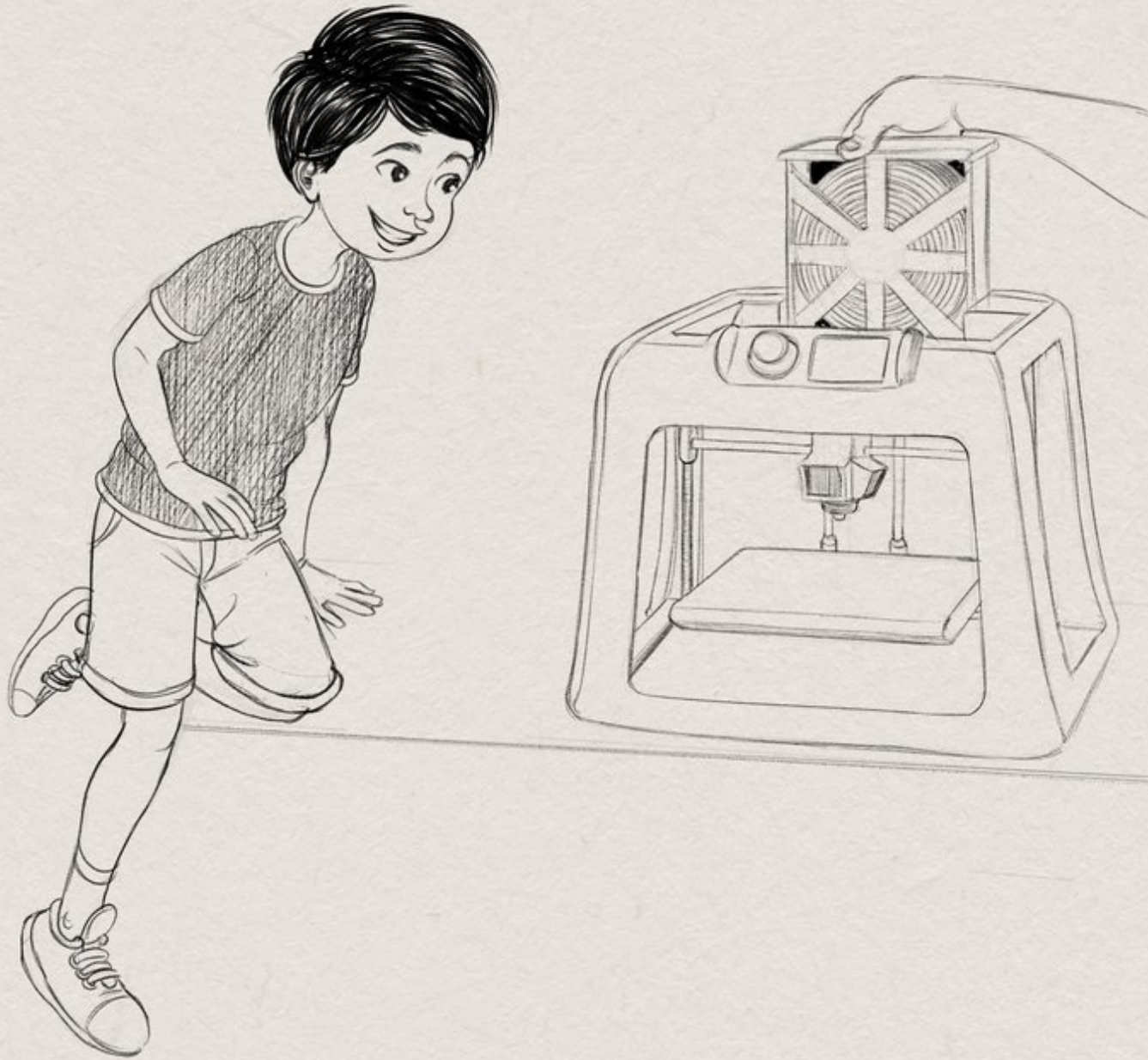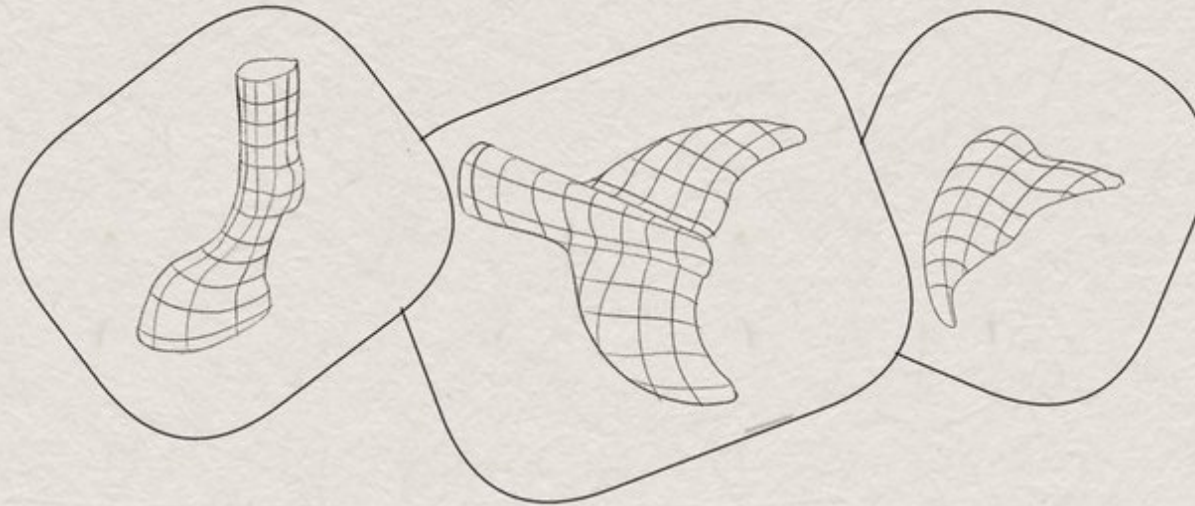
Arzoo points to a small yellow cup on a screen.

"If you print that, what you get is a photo of a cup on paper. It's flat, and it only has two dimensions, the length of the page and the height. With 3D printing, you add a third dimension–depth."

Neelu looks inside the printer and sees little spools that look like strings.

"This is what our cup will be made of," says Arzoo. "This is bioplastic, but you can use other material. Metals, wood, nylon, even food or human cells! You have to be able to melt it so it can take the shape you want."

Miru Mashi says 3D printing can create almost anything.

"Like the shape of a bird's beak or a dolphin's tail or…"

"A horse's leg?" Neelu asks.

"Yes, maybe for a small horse someday," Says Miru Mashi.

Neelu is thinking about the horses at the Maidan, and three-legged dogs he often spots on the streets. He has a lot of questions about how 3D printing can help injured animals.

Arzoo tells Neelu that 3D-printed animal prosthetics is going to be the next big thing.

"There are so many animals who are living better lives because of 3D-printed prosthetics."

She tells him how 3D-printed paws were created for a dog with disabled front legs to help him run better.

Salil adds that in Northwestern University, in the USA, they created 3D-printed ovaries for a mouse, who then gave birth to baby mice!

It's time for Miru Mashi to leave. Neelu has learnt so much about animals and animal rescue from her. He tells her that he wants to be a veterinary surgeon when he grows up and use 3D printing to recreate limbs for injured animals.

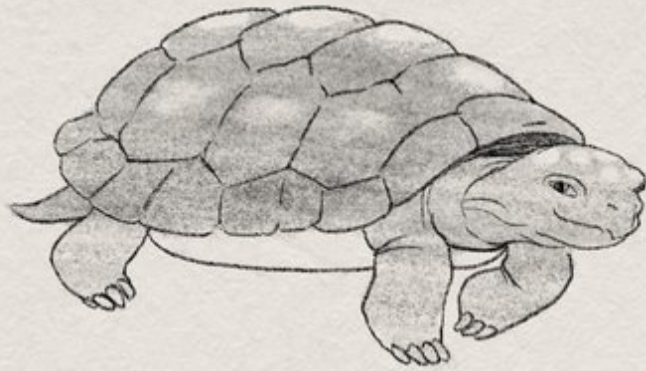Until then, Neelu is happy spending time with animals at the shelter, especially the horses.

Holly the Horse, Australia
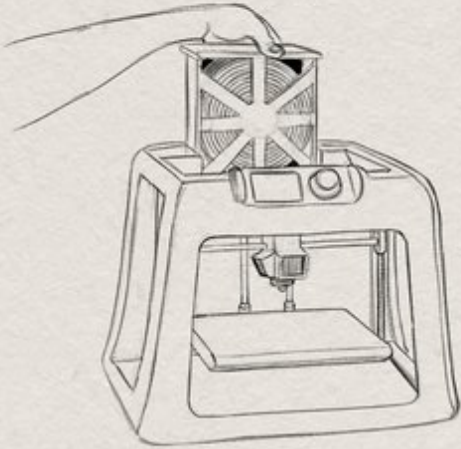After three years of suffering from laminitis, Holly was about to lose her ability to walk. To prevent that, she got 3D-printed titanium horseshoes.

Fred the Red-footed Tortoise, Brazil

Fred lost most of her shell in a forest fire. She had also suffered from pneumonia and had nothing to eat for 45 days. She was rescued by a group of veterinarians and a dental surgeon, who created a 3D-printed shell for her.

Grecia the Toucan, Costa Rica

The top part of Grecia's beak broke off after a brutal attack by a group of boys. He couldn't forage for food, defend himself from predators, or even sing! Now he has a 3D-printed beak.

LET'S PRINT IN 3D

3D printing is a process of making three-dimensional objects from a digital file.

The image is chopped into slices and fed to the printer. Whichever material is chosen for the 3D-printed object, the printer will pull it through a tube at a very high temperature. It comes out of a nozzle at the end in a very thin strand.
The strands are deposited layer by layer on the plate and only after all the layers are printed is a 3D-printed object ready.

In the future, 3D printers can help us reduce waste and pollution, and treat injuries.

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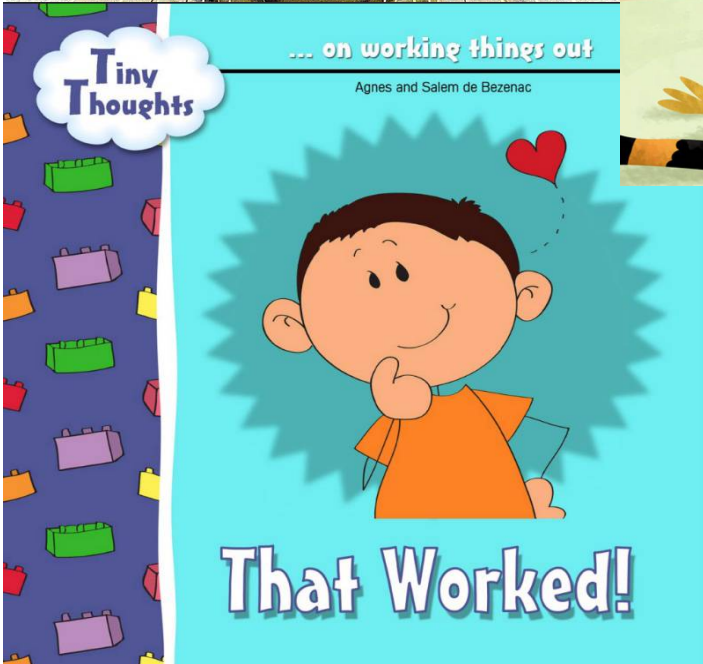
Neelu and the Phenomenal Printer
(English)

Neelu loves animals. When he sees an injured horse on the streets of Kolkata, he wants to help the animal. Neelu is introduced to the world of 3D printing where whatever you think of can be printed. Cups, plates, pencils and, in the future, even hooves for a horse! Can technology help injured animals live a better life?

This is a Level 4 book for children who can read fluently and with confidence.

This page is added for identification purposes