



Paul and the MOSQUITOES

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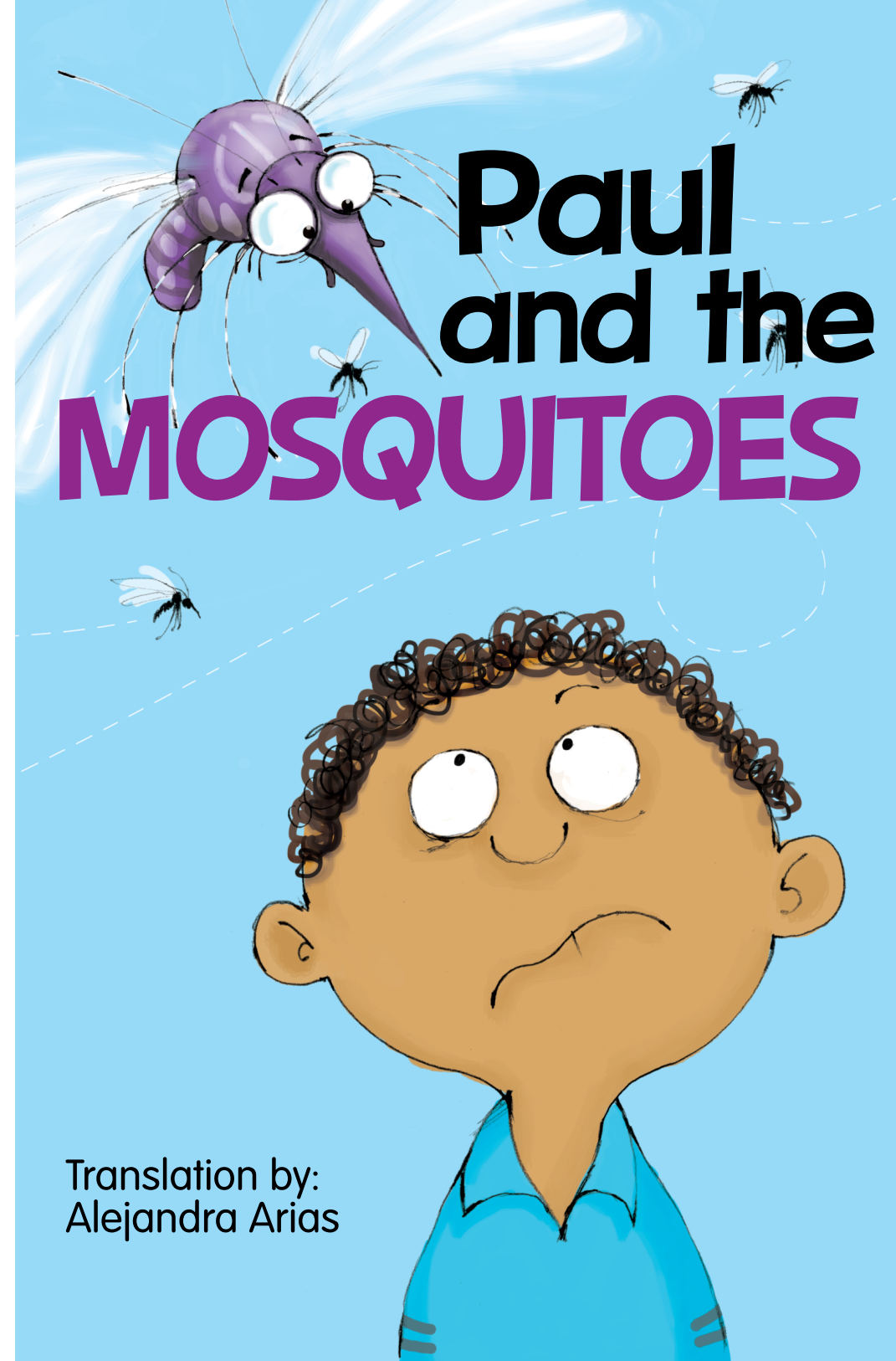
© Paul and the mosquitoes

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SOCIEDAD MEXICANA DE VIROLOGÍA

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Translation by:
Alejandra Arias

HAPPY BIRTHDAY!!!

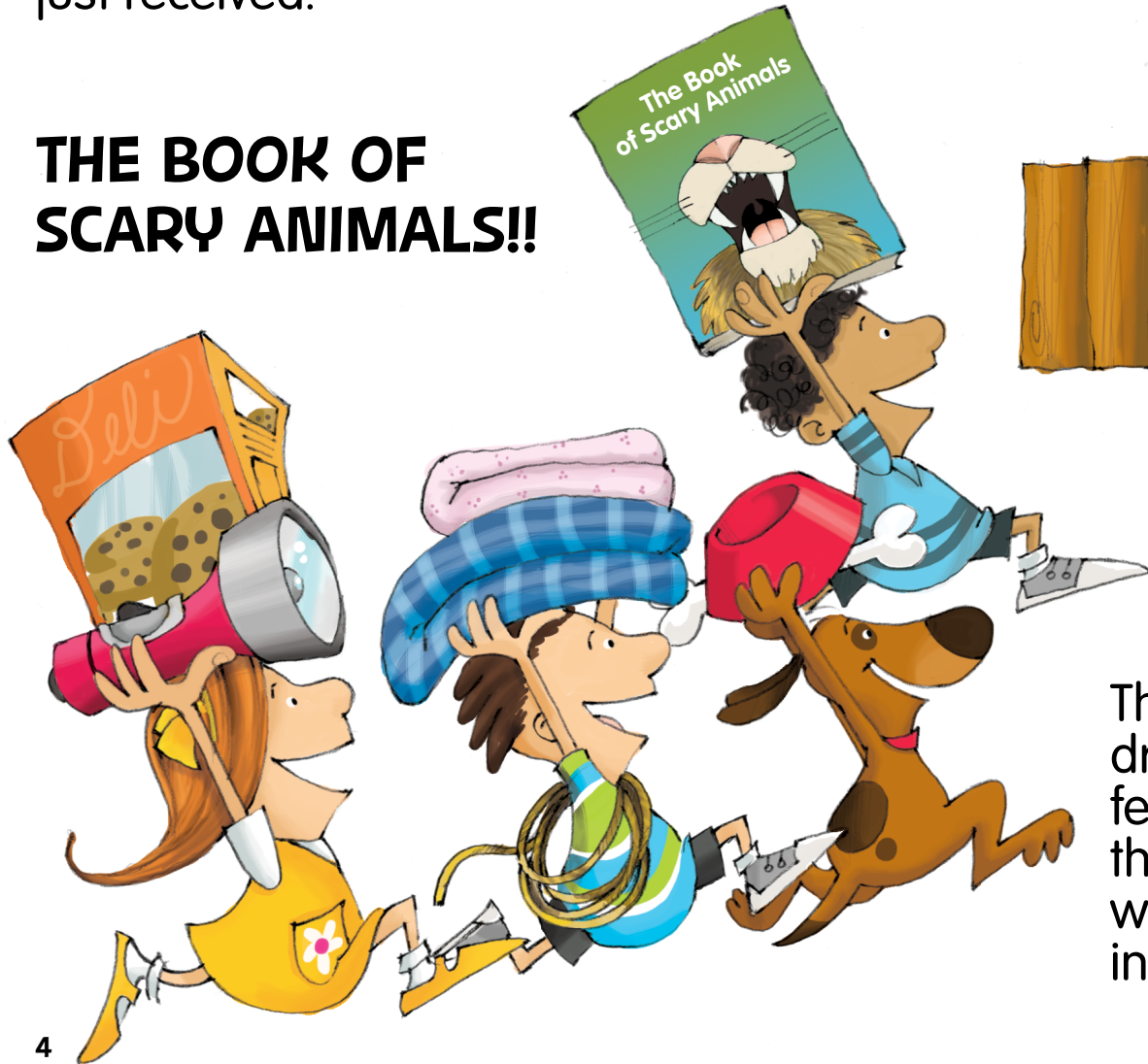
Luis and Sophie said as soon
as Paul opened the door.



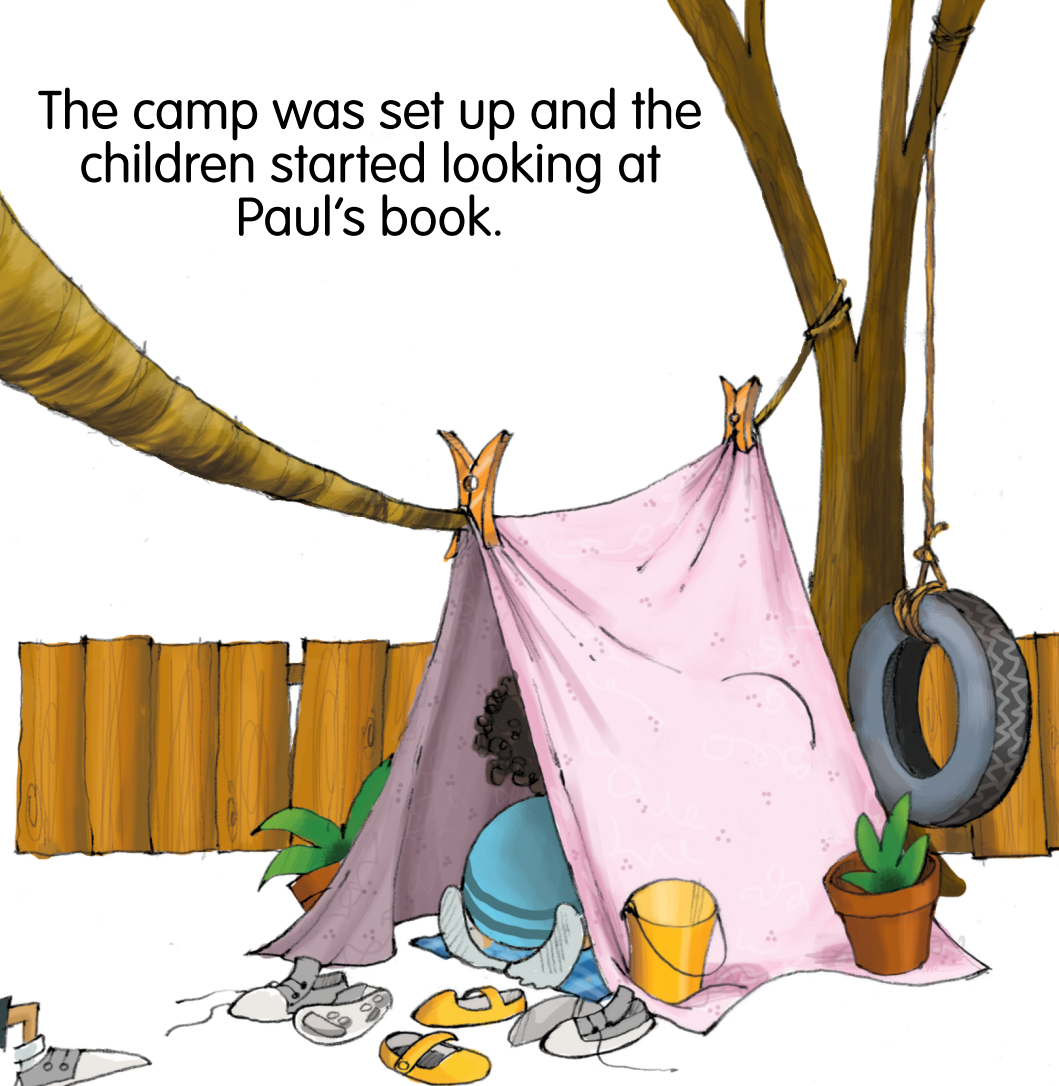
Let's put the camp together!
Said the three children,
and got to work.

Luis got a sheet, a blanket and a rope.
Sophie brought cookies and a flashlight,
and Paul brought the present that he had
just received:

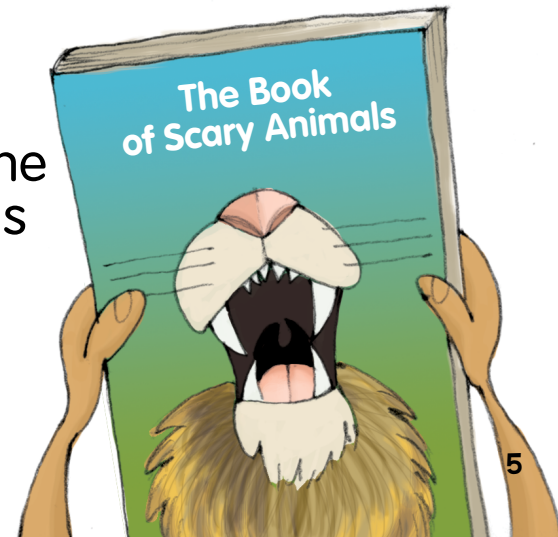
THE BOOK OF SCARY ANIMALS!!



The camp was set up and the
children started looking at
Paul's book.



There they saw
drawings of all the
ferocious animals
that could be
waiting for them
in the forest.



Paul read:

BEARS

have huge
claws!

Getting under
the blanket,
Sophie said:

But
LIONS

have bigger teeth
and they are
the most
dangerous of all,

The strongest of
them all is the
**Tyranosaurus
rex!**

Luis interrupted.

Then Sophie yelled:

Paul!
**You have a
bug on your
face!**



**but if it's only
a mosquito!**



A MOSQUITO!!!

My mom always says mosquitoes
can be as dangerous as the most
ferocious beasts!



Paul and Luis laughed saying:

How can such
a tiny bug
be so
dangerous?



Sophie replied:

very dangerous!

Our cousin John
got sick with
dengue and the doctor
said it happened
because he was
bitten by a mosquito.



He felt very sick,
he had a fever, and
his head and all of
his bones hurt.
He missed school
for a whole week!

DENGUE?



What is that?
And what
does
that have to
do with
mosquitoes?

Who knows!
We better go
ask the teacher.



On Monday, the three children went back to school and told their teacher about their camp adventure.



Is it true that
mosquitoes are
dangerous?

Of course! Mosquitoes are
dangerous because when they
bite they can transmit many
diseases.

Like the dengue that our
cousin got?



Exactly!

Dengue is a disease caused by a **virus** that's also called **dengue**. Lots of people get **dengue** in places where it's hot and there are mosquitoes.

VIRUS?

Didn't you say they were mosquitoes?

I have an idea! A friend of mine is a scientist. I'm going to invite her so she can explain these things better.

The next day the teacher arrived with her scientific friend.

Ana turned out to be a very nice scientist.



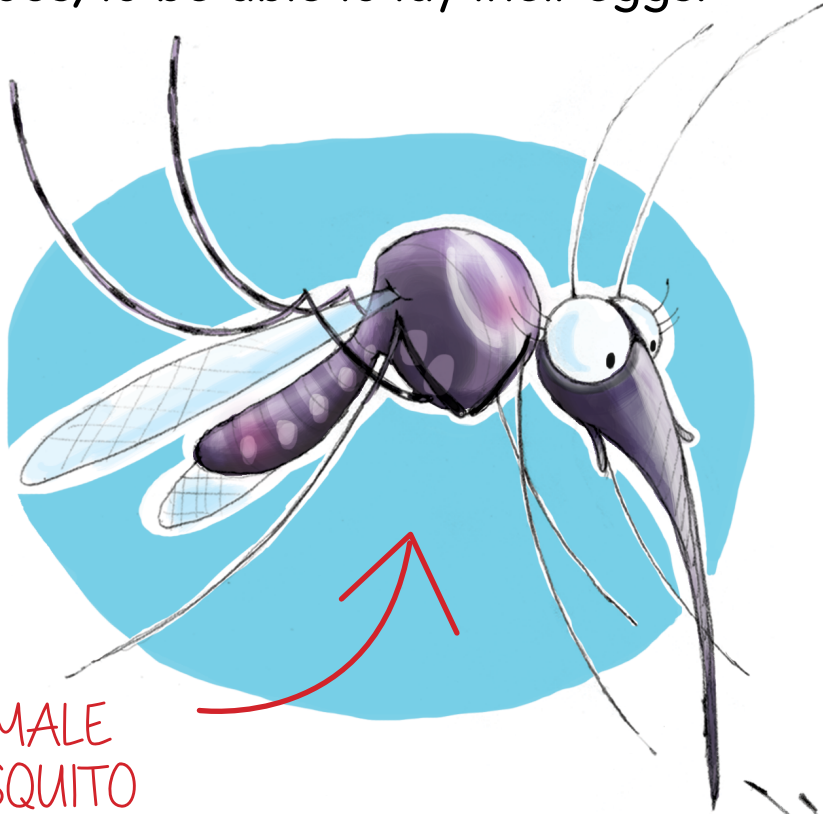
Hello children, this is my friend Dr. Ana, she is an expert in mosquitoes and the diseases they can transmit.

She was wearing a backpack filled with nets, magnifying glasses and exploring instruments.

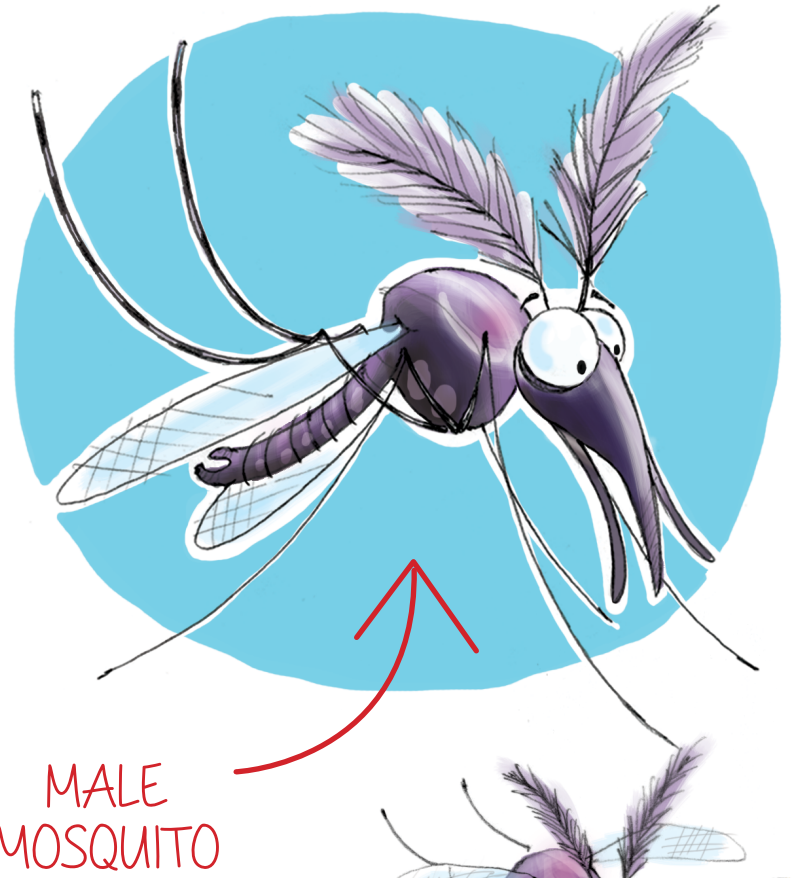


She began her explanation by saying that only female mosquitoes bite because this way they feed on blood, which is very nutritious, to be able to lay their eggs.

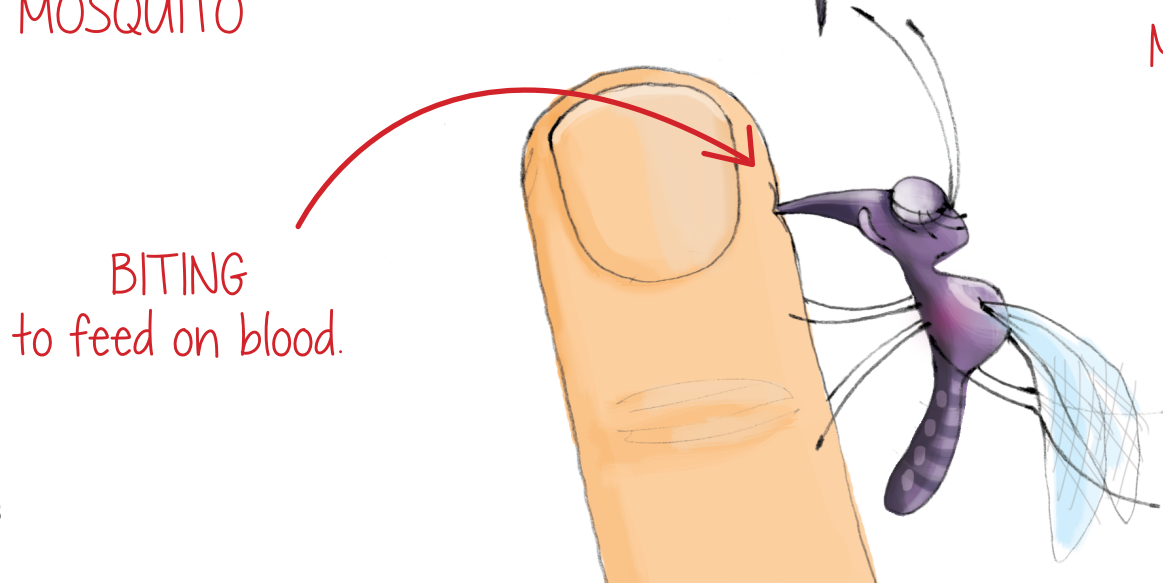
Instead, males mosquitoes only feed from the nectar of flowers.



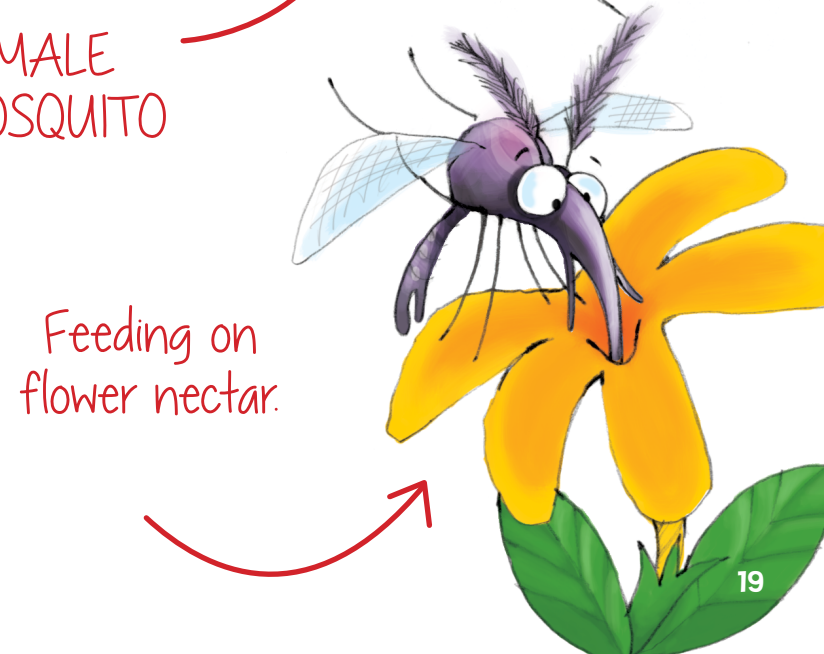
FEMALE MOSQUITO



MALE MOSQUITO



BITING to feed on blood.



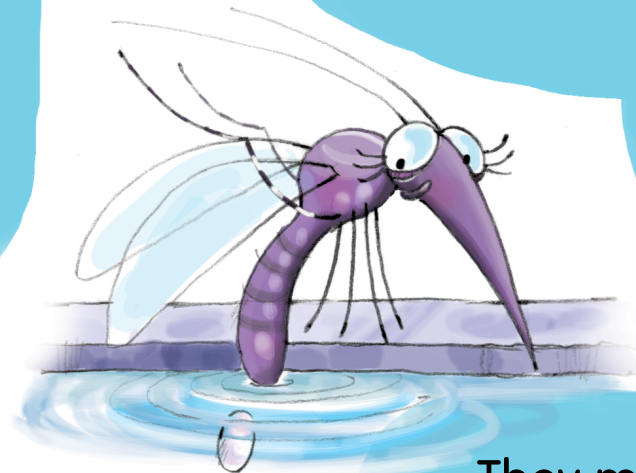
Feeding on flower nectar.

**So,
only female
mosquitoes
bite?**



That's right!

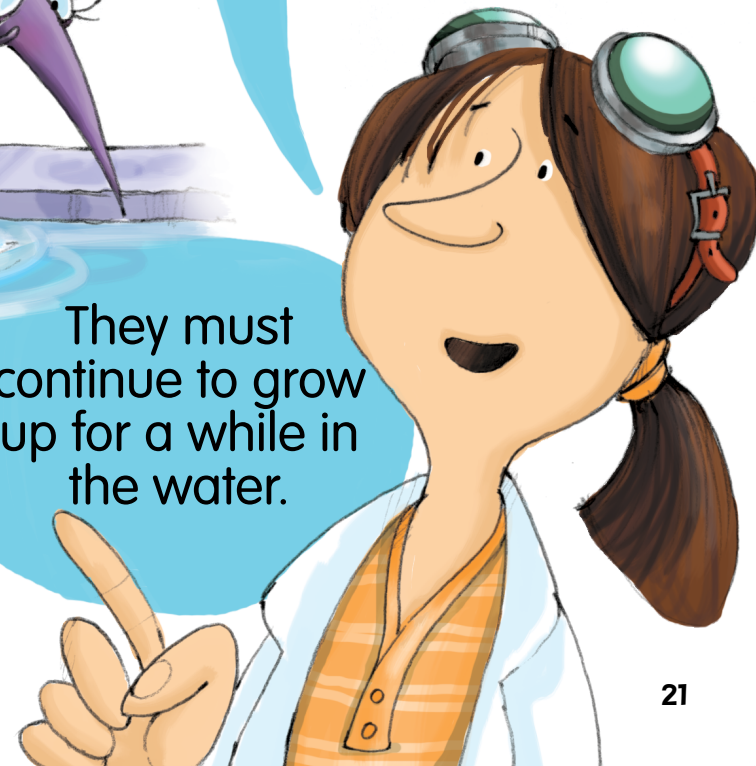
Thanks to the blood they fed on, females can lay eggs, which they place in still water. The eggs are left floating and a little bit later baby-mosquitoes are born, they still don't look like their parents nor can they fly.



EGGS

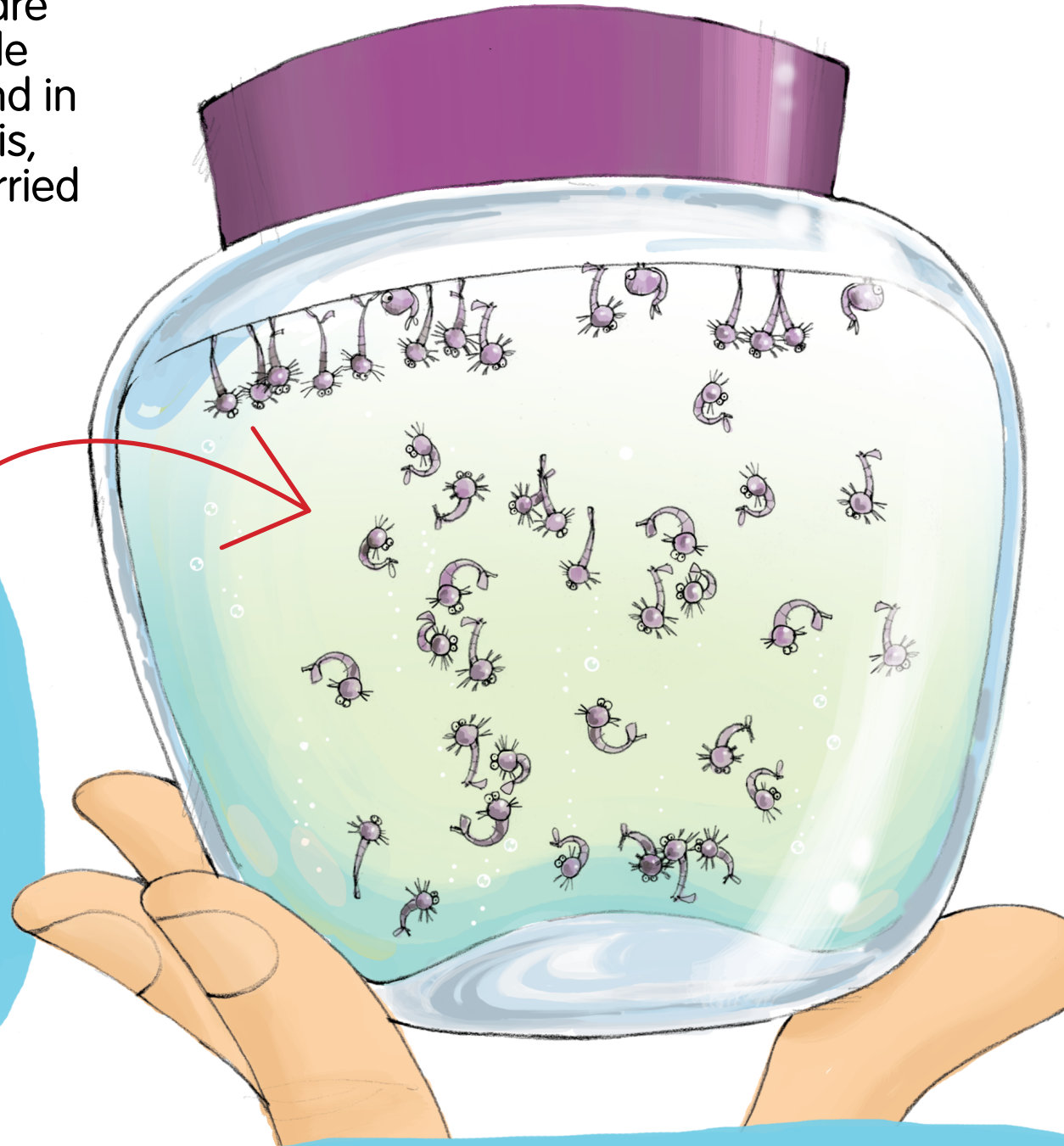


They must continue to grow up for a while in the water.



When mosquitoes are babies they are called **larvae** and they are those little bugs that we can see playing around in puddles of still water. And saying this, Ana showed them a jar that she carried in her backpack where some tiny strange animals played around.

These are the
mosquito's
LARVAE!



She dug into her backpack again,
took out a book and said:

Here you can see the process!

THE LIFE CYCLE OF THE MOSQUITOES



1. MOSQUITO EGGS

Larvae grow in water and change shapes



2



3

LARVAE

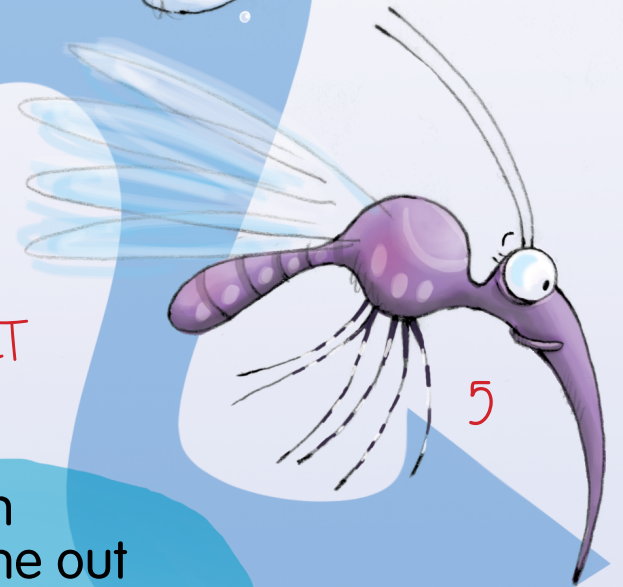
Until finally one day they go out to the surface.

4



COMING OUT OF THE WATER

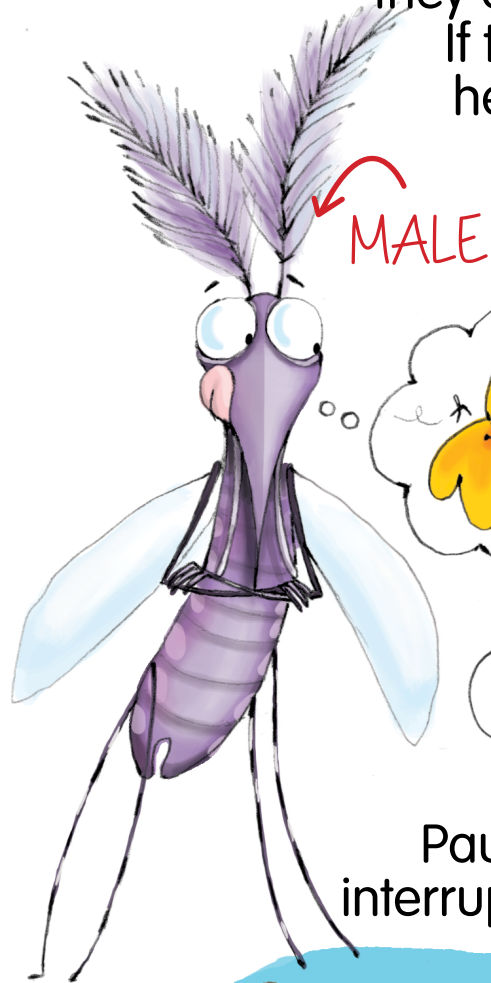
ADULT



5

When they come out of the water they are already the same as their mosquitoes parents and can fly.

And of course, the first thing they do is to look for food!
If the mosquito is male he will look for flowers to sip the nectar
But if the mosquito is female...



FEMALE

Paul interrupted:

It will look for someone to suck blood!



That's right Paul!

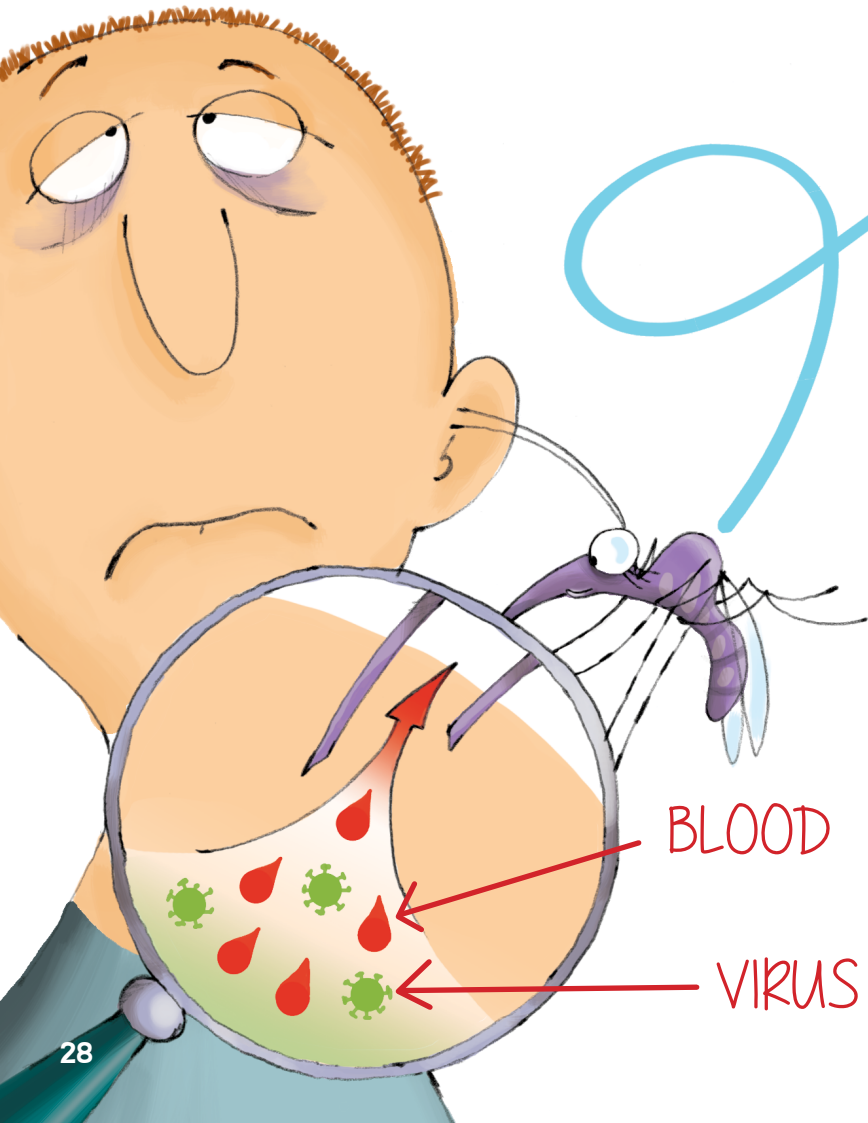
But then, where do the viruses come from?



Ana replied:

When a mosquito bites a person who is already sick with dengue, **in the blood it sucks there is also the virus.**

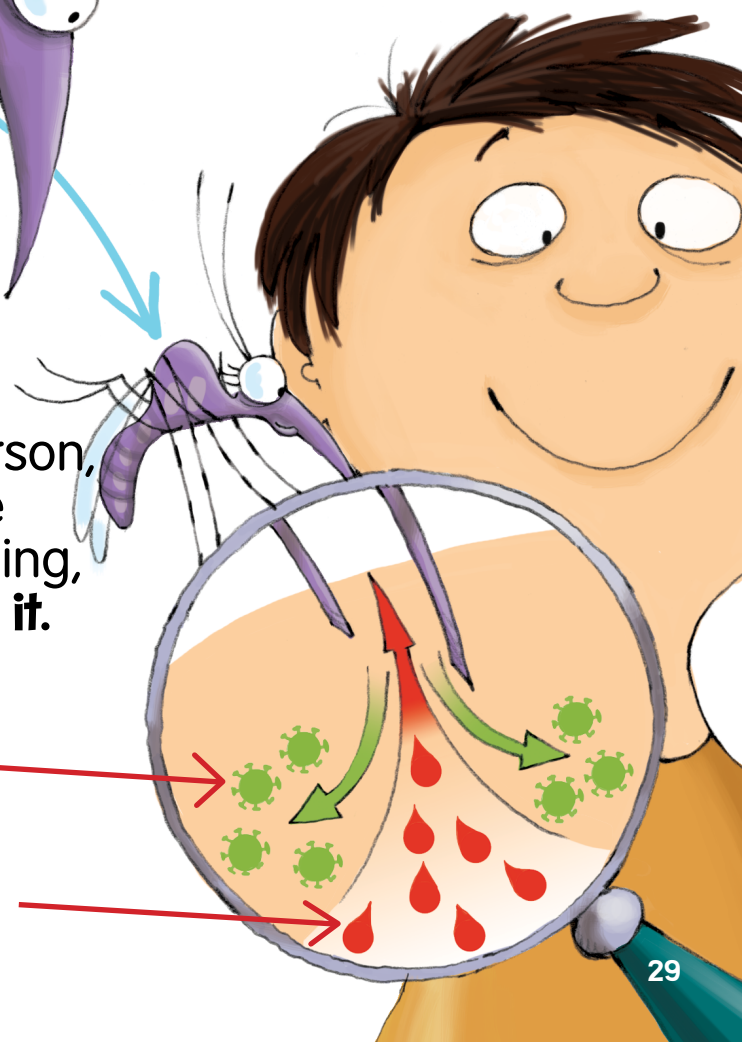
The virus multiplies inside the mosquito...



...and when it bites another person, it injects the virus, meaning, **it transmits it.**

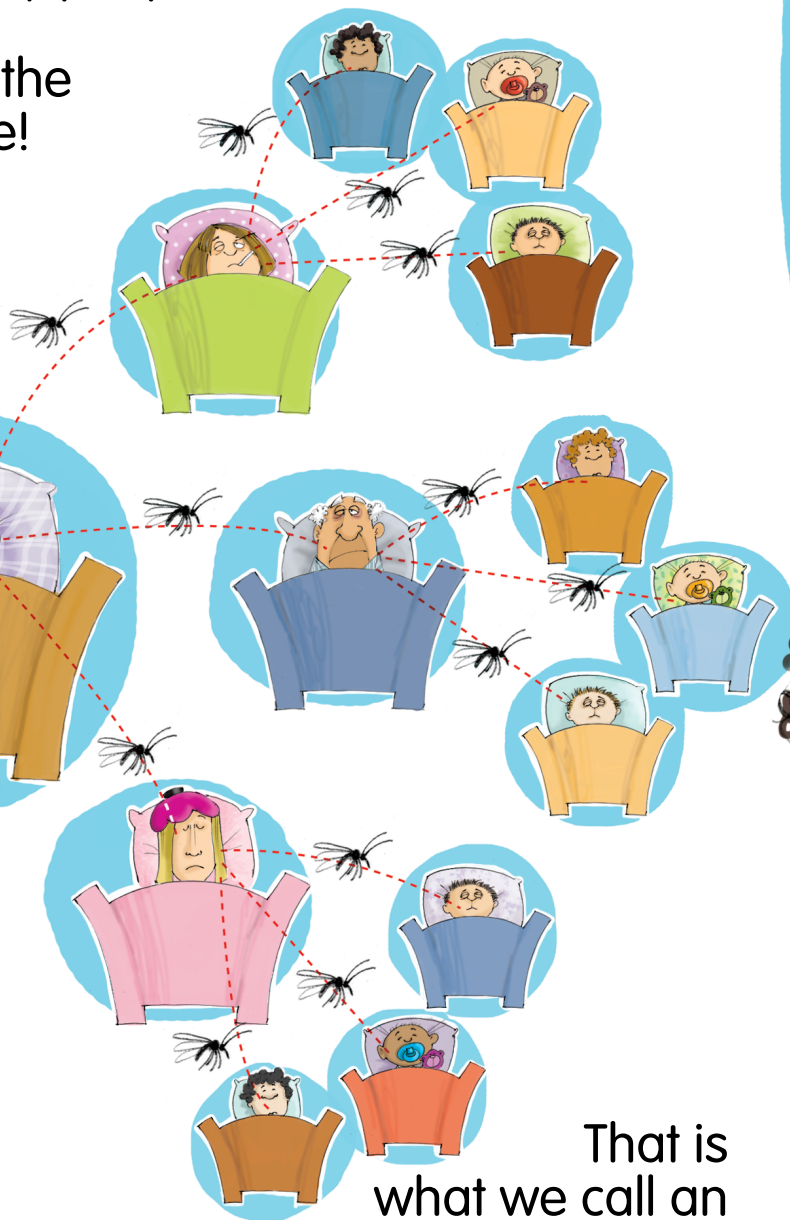
VIRUS

BLOOD



And if that newly sick person gets bitten by another mosquito, the virus continues transmitting and can affect many people.

All sick at the same time!



That is what we call an **EPIDEMIC.**

In addition to dengue, mosquitoes can transmit many other diseases, such as

**Zika
chikungunya
or
malaria.**



So what causes those diseases is **not the mosquito, but the virus?**

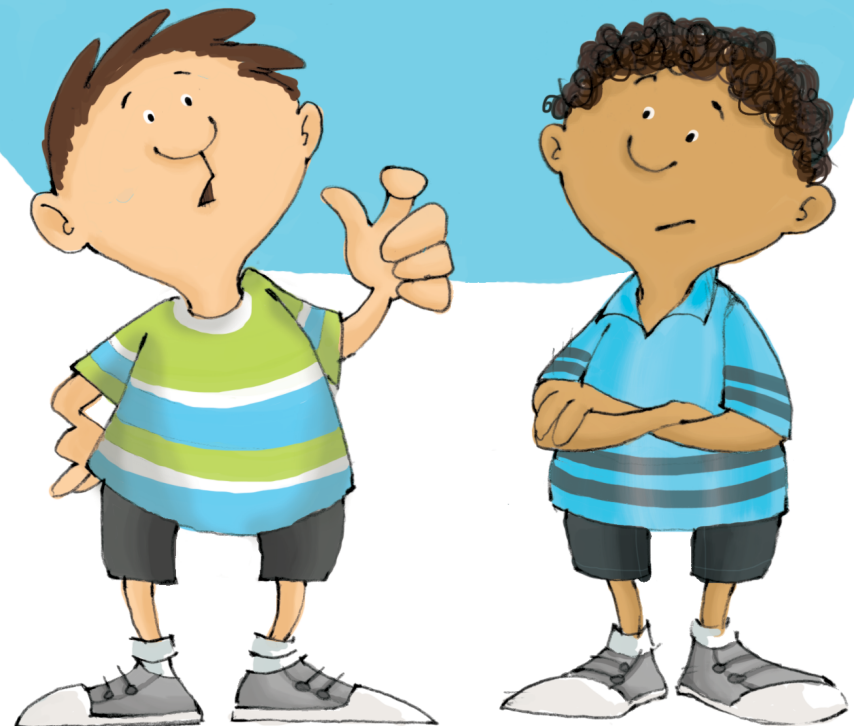
Exactly!

The mosquito is the medium where viruses transport and multiply.



Let's see ... then,

**if there were
NO MOSQUITOS
to
TRANSPORT it,
the VIRUS WOULDN'T
get to people...**



... and if people
don't get VIRUS...
**They don't
get sick!!**



Exactly!

**Such
clever
kids!**



**I told
you
so!**

**So what can we
do to prevent
diseases
transmitted by
mosquitoes?**



Paul shouted with great enthusiasm:

**Don't let
mosquitoes
BITE US!**



Ana smiled and said: You're right Paul! but we can also get rid of the places where water accumulates so mosquitoes have no place to put their eggs.



**If there are
no eggs,**

**there are no
mosquitoes!**



On the radio
campaigns
they say:

**THROW AWAY
CLEAN IT UP
TURN IT OVER
COVER IT UP**

THROW AWAY

Things that are no longer needed, so that water does not accumulate in them.



CLEAN IT UP

Things and places that usually have water, such as vases, fountains, or flowerpots.



Ana added:

This is very important because mosquitoes need very little water to lay their eggs.

TURN IT OVER

buckets or other things where water accumulates, so they dry up.



COVER IT UP

Containers that are used to stock water.



Very good! The teacher replied.
That way there will be fewer mosquitos
around us and less chance for them to
bite us. Sophie added:

**we need everyone
to know this!**

They took brushes and cardboard and
each one made a poster.



Even Ana and the teacher helped!



Ana laughed! Of course not!

But what can we do if we live near places where there are rivers, lakes, or high humidity? Or if we are visiting there?

It is not possible to flip nor cover a river!

But we can avoid **throwing trash**

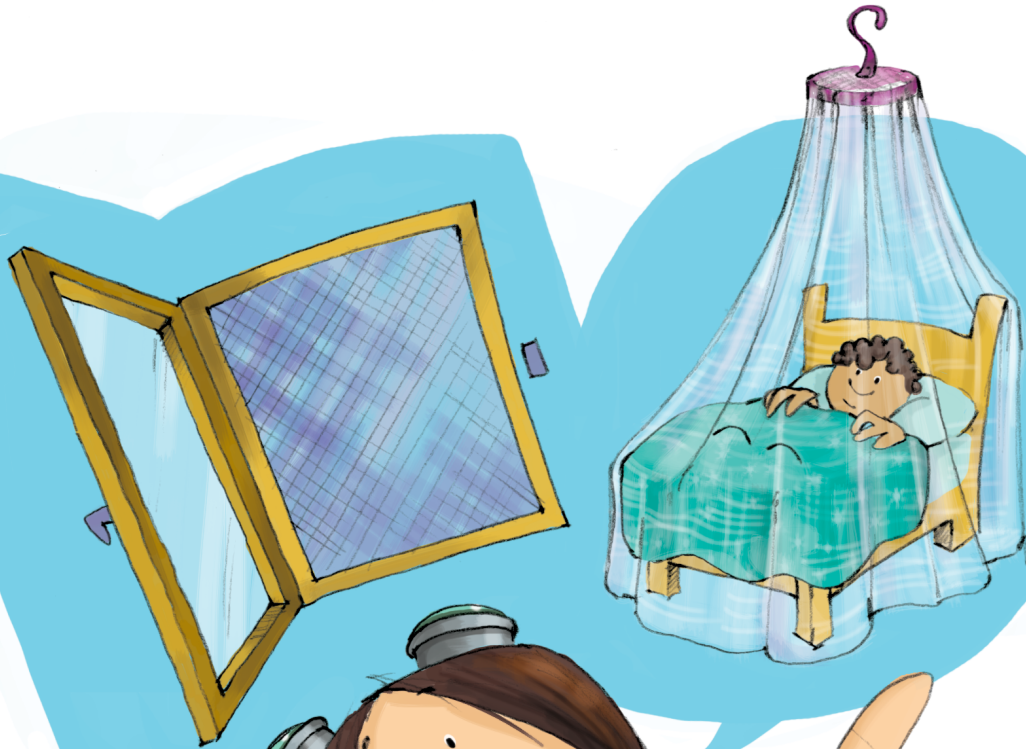
into the water, so the water doesn't become stagnant...

and use insect repellent.



We can also put mosquito nets on doors and windows and sleep under a pavilion that covers us.

Of course! said Paul, my dad can help us put mosquito nets in school.



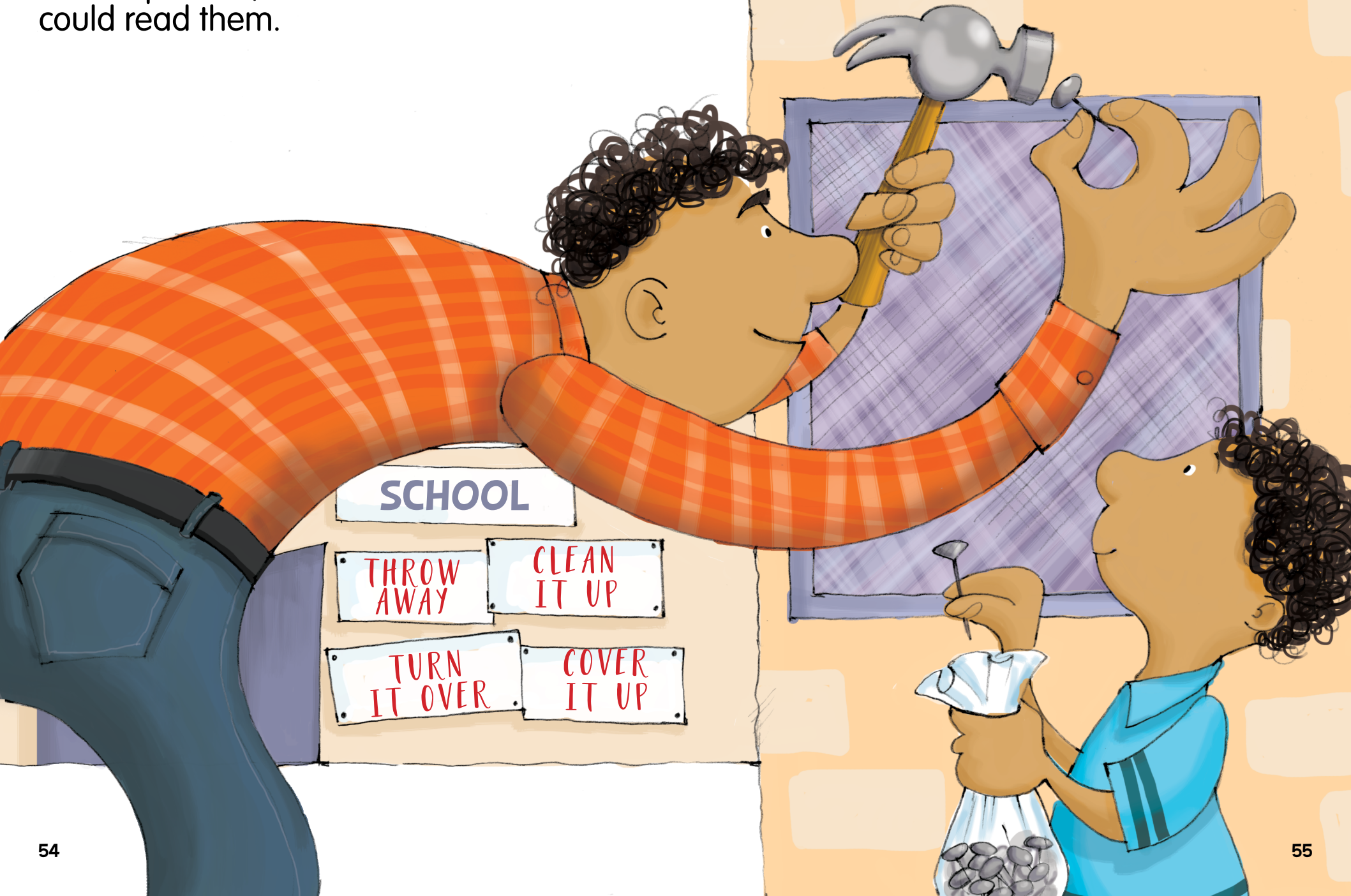
Are there any vaccines against dengue?



Not yet, but we hope that soon scientists find one to protect us all from the virus.

The children finished making their posters and posted them at the school entrance, so that parents, teachers and all the kids could read them.

And Paul asked his dad to put the mosquito nets on.



The next weekend the children planned to go camping again. They ran to check the area where they used to camp and discovered many places where the water accumulated.



THROW AWAY, CLEAN IT UP, TURN IT OVER, COVER IT UP!

THROW AWAY, CLEAN IT UP, TURN IT OVER, COVER IT UP!

THROW AWAY, CLEAN IT UP, TURN IT OVER, COVER IT UP!

THROW AWAY, CLEAN IT UP, TURN IT OVER, COVER IT UP!



They did quite an inspection!

This time Luis brought something very special: a pavilion to build the camp without mosquitos getting in!



After seeing the posters they made in school, his parents decided to give it to him so they wouldn't stop camping!

Besides cookies and the flashlight, this time Sophie brought a big bottle of repellent which they put on immediately!



And Paul brought his book of scary animals.

The kids began to read:

-Bears have huge claws.

but lions have the biggest teeth and they are more dangerous...



The mosquito!



And almost at the same time the three said:
- but the most dangerous of them all iiiis:

And closing the net, Sophie said:

This camp is
closed for
mosquitoes



WHO MADE THIS BOOK?

Susana López



She works at the Institute of Biotechnology of UNAM in Mexico and studies rotaviruses, which cause gastroenteritis in small children, because she wants to find new ways to protect children against the disease caused by these viruses. She uses microscopes and special equipment. When she is not working she likes to read books or to cook, using regular pots and pans.



Martha Yocupicio

She tries to understand what is happening when viruses infect our cells, and how the cells fight back. In her free time, she likes to read books of detectives that use their reasoning to resolve interesting mysteries.

Selene Zárate

Besides being a mom, this Mexican scientist studies how viruses evolve and escape from the immune system and from drugs, and how to prevent this from happening. When she is not working, she takes care of her two naughty little ones and rediscovers with them how the world works.



Eva Lobatón

She has a big colorbox and a computer, that she uses to write and color books and magazines. Besides having fun, she thinks that her drawings can communicate many messages. When she is not working she likes to observe things around her.



Martha, Selene and Susana have support from the National Strategic Program on Research and Incidence in Virology from CONACyT.

What is and what are the goals of the MEXICAN SOCIETY FOR VIROLOGY?

A group of researchers from a variety of institutions in the country got together with the idea of creating the Mexican Society for Virology (Sociedad Mexicana de Virología-SMV) to promote research and innovation, training of students with high academic standards, technological developments and the communication of virology.

Viruses are the most diverse and most numerous microorganisms on the planet. They can infect all known life-forms and are responsible for many human diseases.

Advancement in the knowledge of their biology and of their role in disease are vital for the development of new and improved vaccines, and for the design of antiviral drugs and better diagnostic tools.



The study of their epidemiology, evolution and ecology is required to further our understanding of their patterns and mechanisms of distribution and dispersion, which can in turn be used to generate new methods for disease prevention and control.

The SMV aims to promote collaborative links between research groups on all aspects of virology, from basic to clinical and epidemiological studies, and to contribute to the efforts of the Mexican health system to respond, effectively and efficiently, to health emergencies of viral origin.

The SMV also aims to communicate to the general public topics on virology that are of interest to all.

Be sure to look for our publications and videos!

<https://www.smvirologia.org>



<https://www.facebook.com/SocMexViro>



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Sociedad Mexicana de Virología



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In his camp, Paul and his friends discuss which is the most dangerous animal of all. They would have never imagined it would be the mosquito. Why are they dangerous and what can we do to prevent the diseases transmitted by them?

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