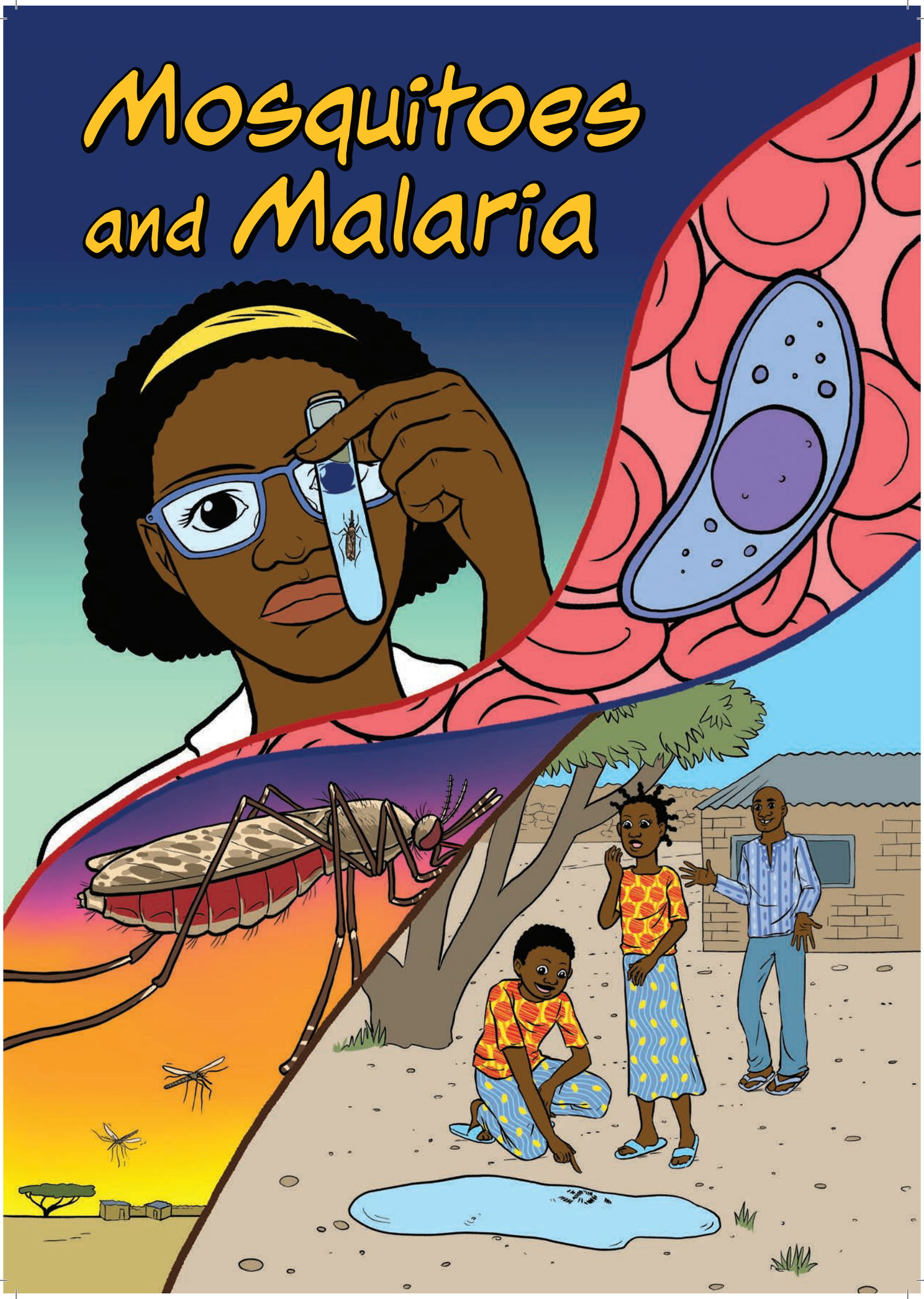
Mosquitoes and Malaria



A comic booklet designed and illustrated by Zu Dominiak in collaboration with Imperial College London.

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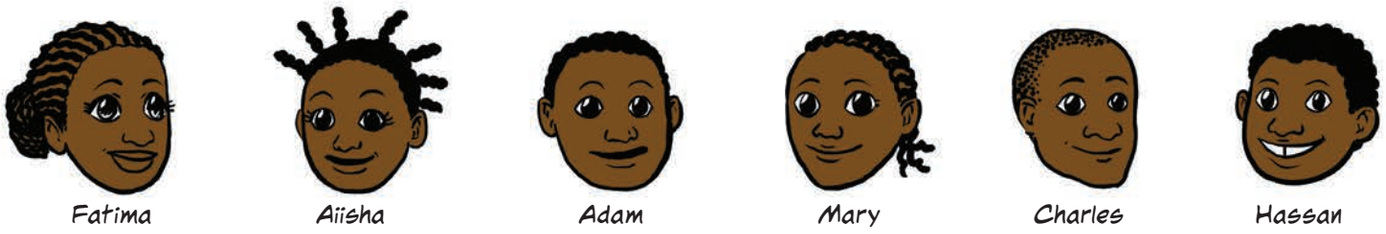
Imperial College London

TARGET MALARIA

A Vector Control Research Alliance


Fatima
Aiisha
Adam
Mary
Charles
Hassan


Hey Aiisha and Adam!
Hello...
What's wrong?

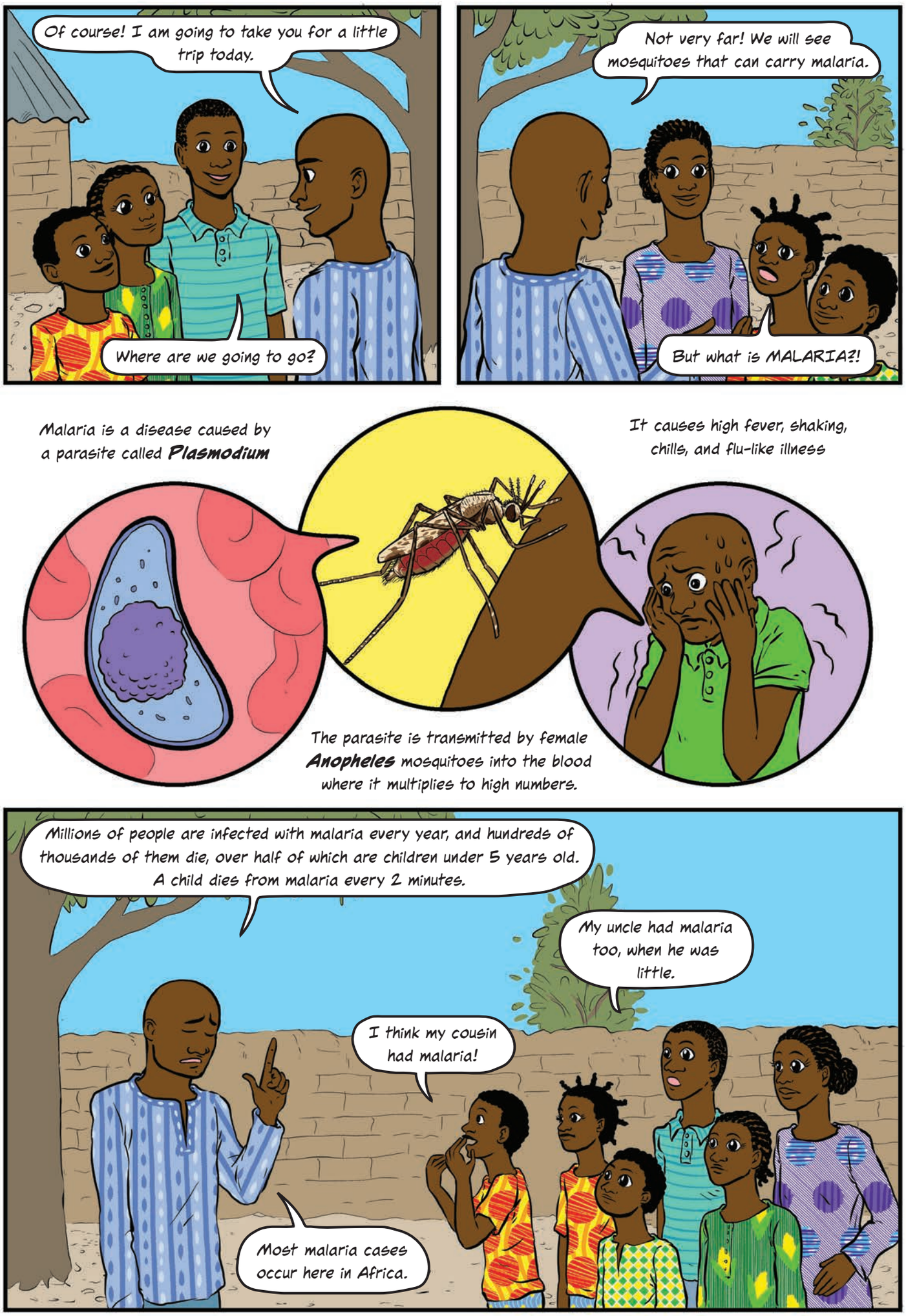

We weren't sleeping under our bed net. It was too hot!
Mother got very angry...

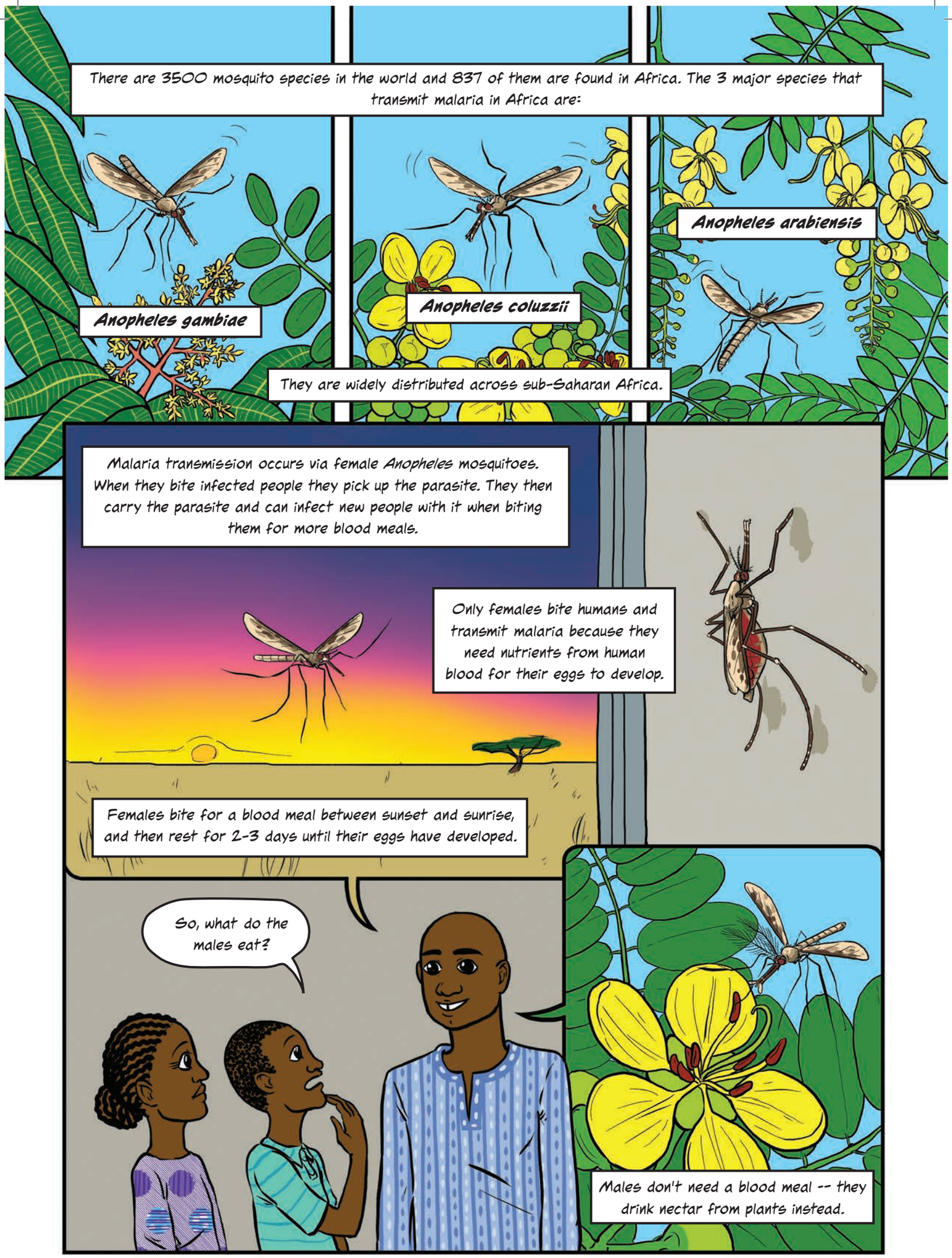

WHAT?! You have to sleep under the net!
You could get malaria if you don't!

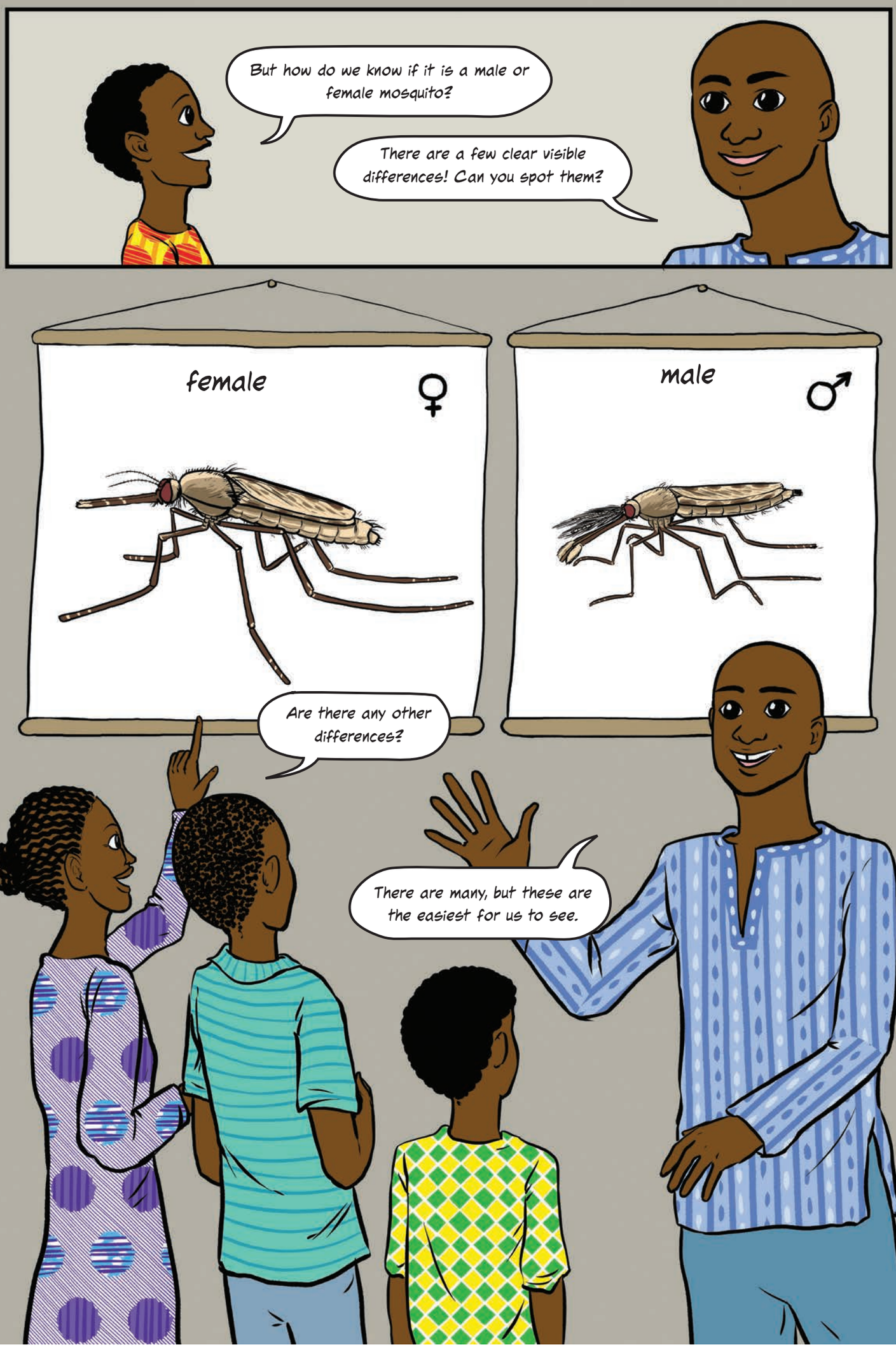

What is malaria?!

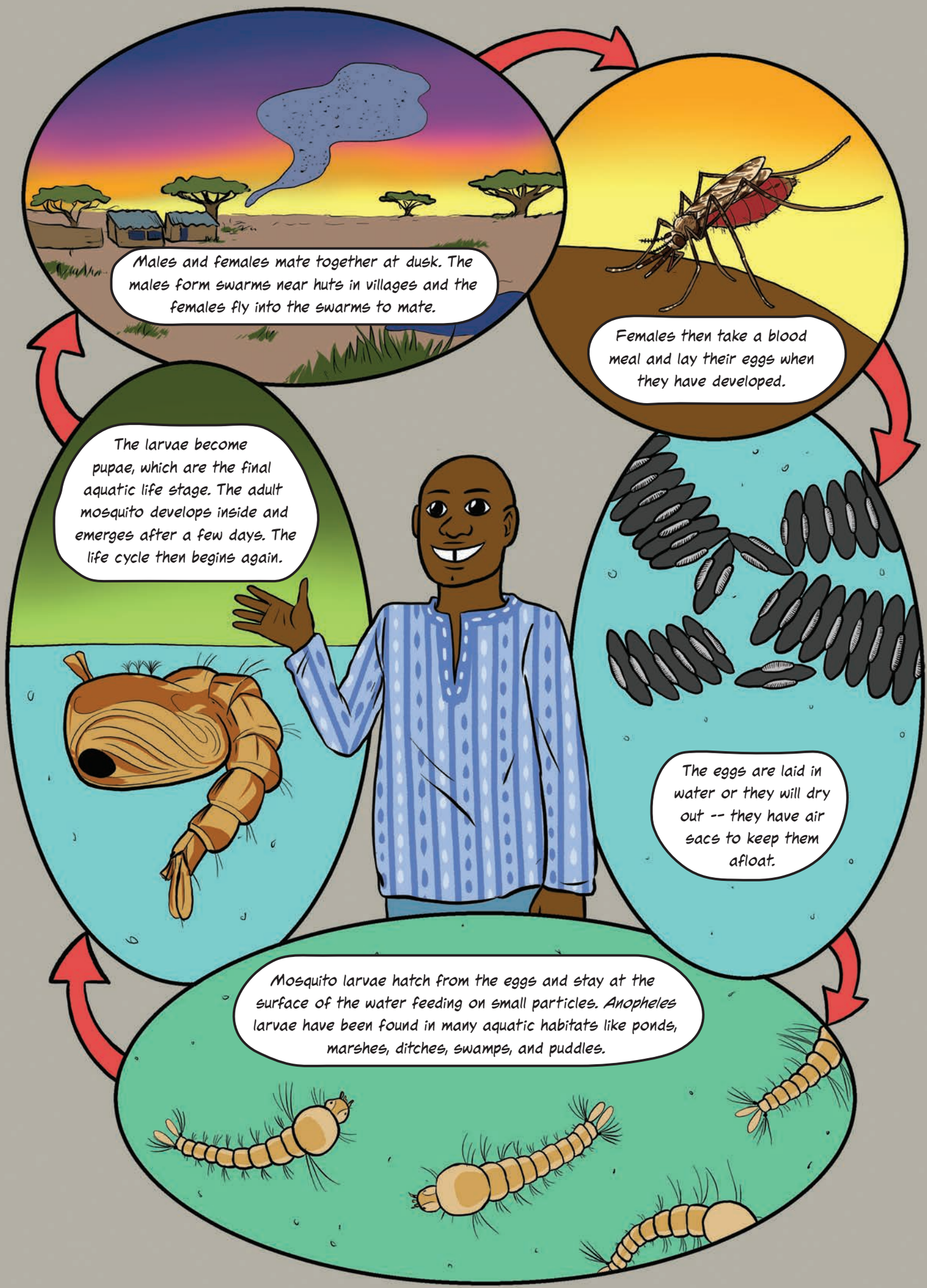

We should ask Mr Sam!
He's such a good teacher - so good at explaining things!

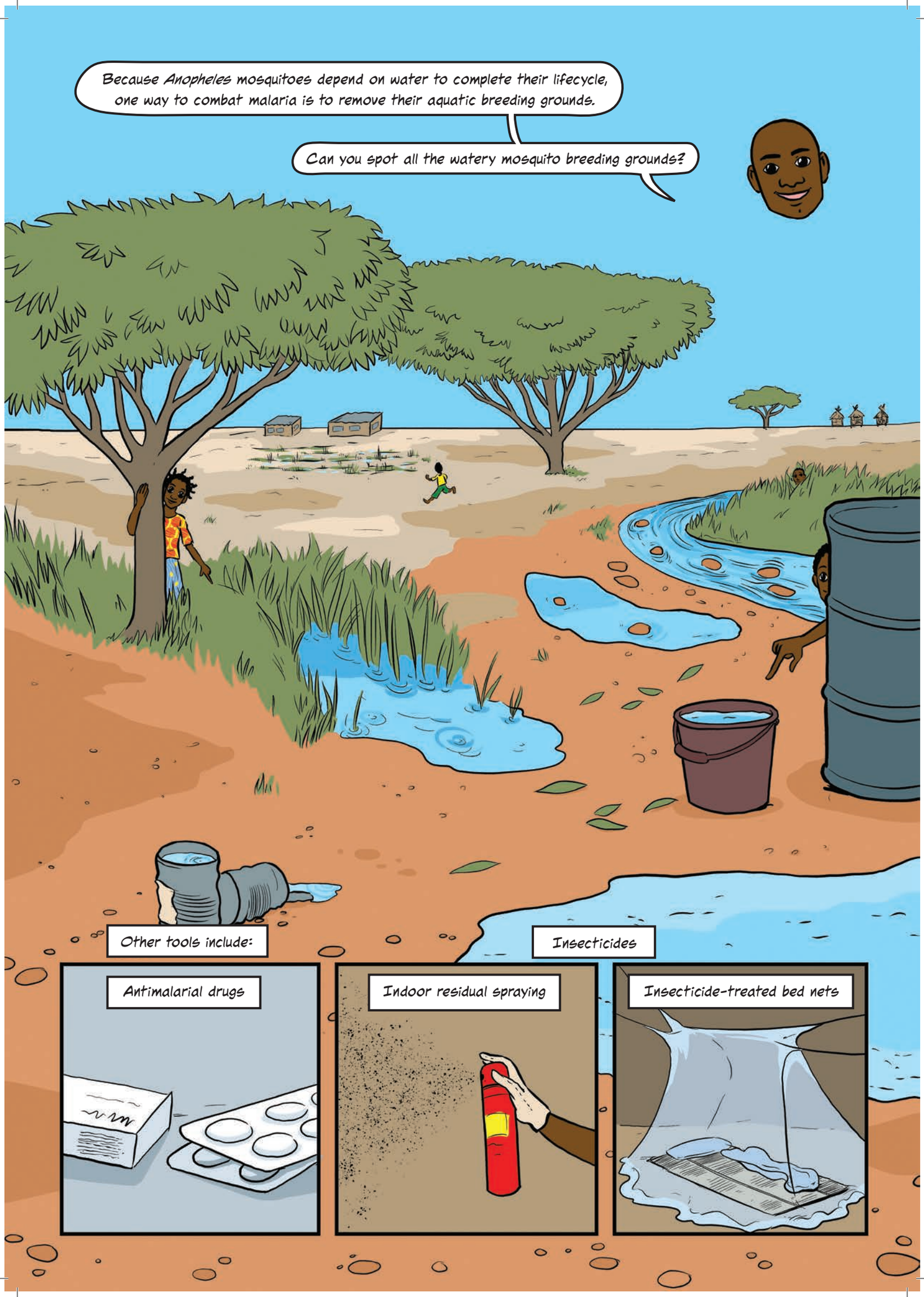

Mr Sam!
Good Morning, children!
Can you explain what malaria is?
Aiisha and Adam don't know!


Of course! I am going to take you for a little trip today.
Where are we going to go?
Not very far! We will see mosquitoes that can carry malaria.
But what is MALARIA?!
Malaria is a disease caused by a parasite called **Plasmodium**
It causes high fever, shaking, chills, and flu-like illness
The parasite is transmitted by female **Anopheles** mosquitoes into the blood where it multiplies to high numbers.
Millions of people are infected with malaria every year, and hundreds of thousands of them die, over half of which are children under 5 years old. A child dies from malaria every 2 minutes.
My uncle had malaria too, when he was little.
I think my cousin had malaria!
Most malaria cases occur here in Africa.


There are 3500 mosquito species in the world and 837 of them are found in Africa. The 3 major species that transmit malaria in Africa are:
Anopheles gambiae
Anopheles coluzzii
Anopheles arabiensis
They are widely distributed across sub-Saharan Africa.
Malaria transmission occurs via female Anopheles mosquitoes. When they bite infected people they pick up the parasite. They then carry the parasite and can infect new people with it when biting them for more blood meals.
Only females bite humans and transmit malaria because they need nutrients from human blood for their eggs to develop.
Females bite for a blood meal between sunset and sunrise, and then rest for 2-3 days until their eggs have developed.
So, what do the males eat?
Males don't need a blood meal -- they drink nectar from plants instead.


But how do we know if it is a male or female mosquito?
There are a few clear visible differences! Can you spot them?
female
♀
male
♂
Are there any other differences?
There are many, but these are the easiest for us to see.


Males and females mate together at dusk. The males form swarms near huts in villages and the females fly into the swarms to mate.
Females then take a blood meal and lay their eggs when they have developed.
The eggs are laid in water or they will dry out -- they have air sacs to keep them afloat.
Mosquito larvae hatch from the eggs and stay at the surface of the water feeding on small particles. Anopheles larvae have been found in many aquatic habitats like ponds, marshes, ditches, swamps, and puddles.
The larvae become pupae, which are the final aquatic life stage. The adult mosquito develops inside and emerges after a few days. The life cycle then begins again.


Because *Anopheles* mosquitoes depend on water to complete their lifecycle, one way to combat malaria is to remove their aquatic breeding grounds.
Can you spot all the watery mosquito breeding grounds?
Other tools include:
Antimalarial drugs
Insecticides
Indoor residual spraying
Insecticide-treated bed nets

But malaria is still a big problem because:

The mosquitoes have developed some insecticide resistance...

...and the malaria parasite is developing resistance to various antimalarial drugs.

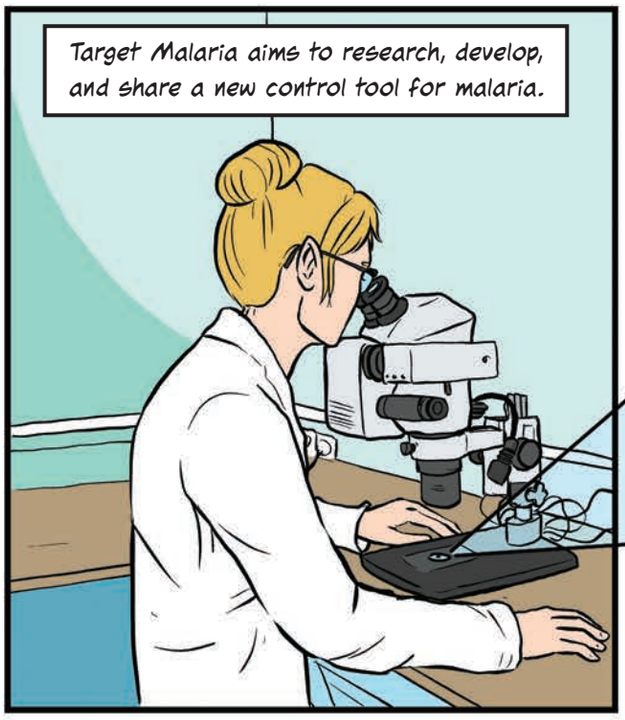
Excuse me, Mr Sam, but how do you know all this?

I went to a meeting with the Target Malaria Stakeholder Engagement team!

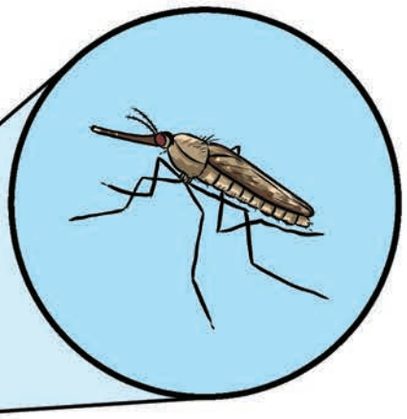
What is Target Malaria?

Target Malaria is a group of researchers that works across the world in the UK, Italy, the USA, Burkina Faso, Mali, Uganda, and Ghana.

Target Malaria aims to research, develop, and share a new control tool for malaria.



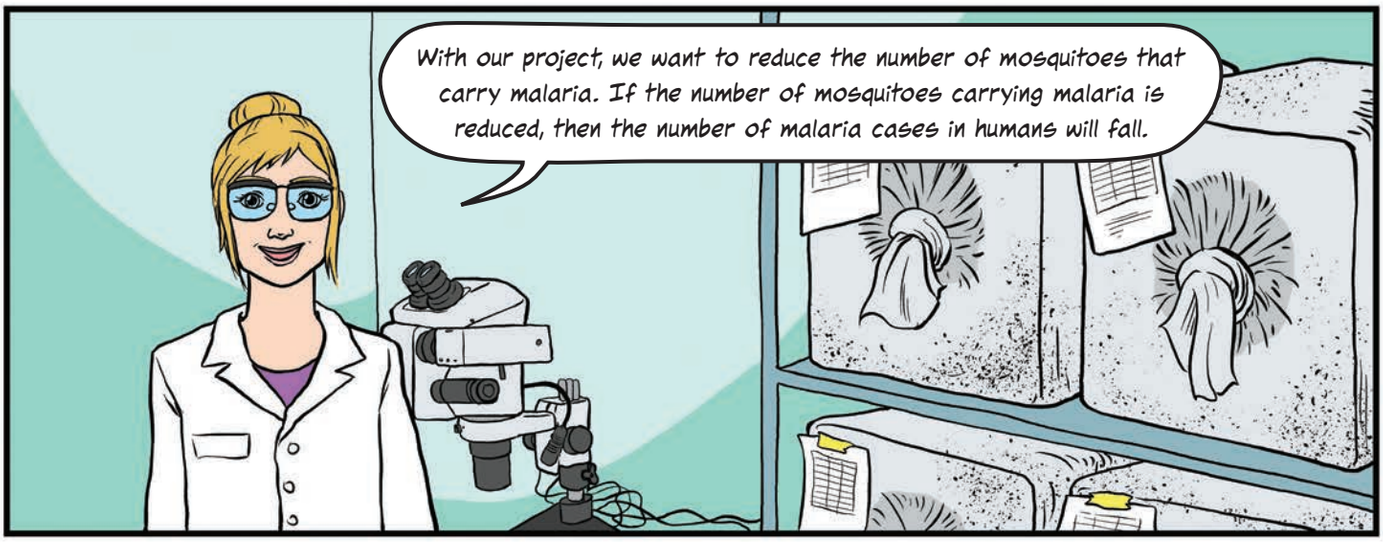
In order to do this, they research and work on the 3 major malaria-carrying mosquito species that we mentioned before. Can you remember what they are?

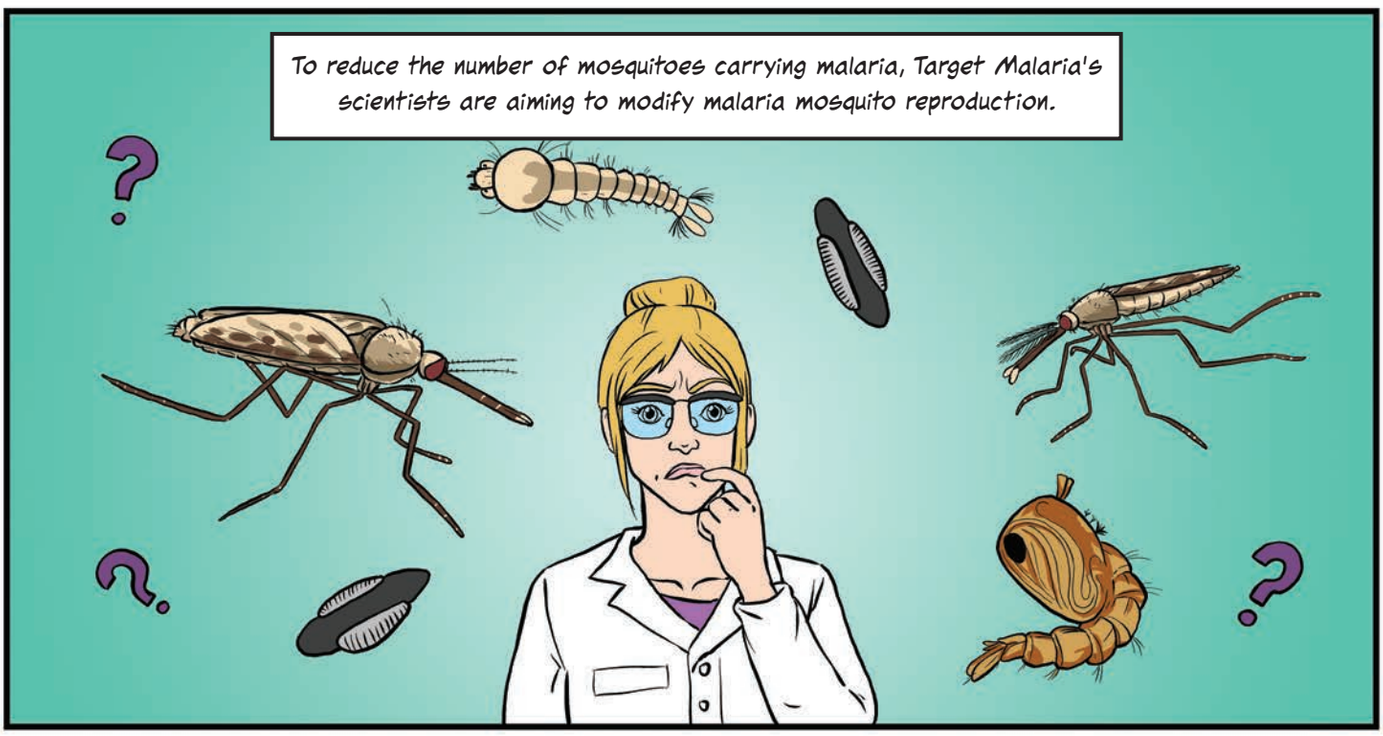


1. .....

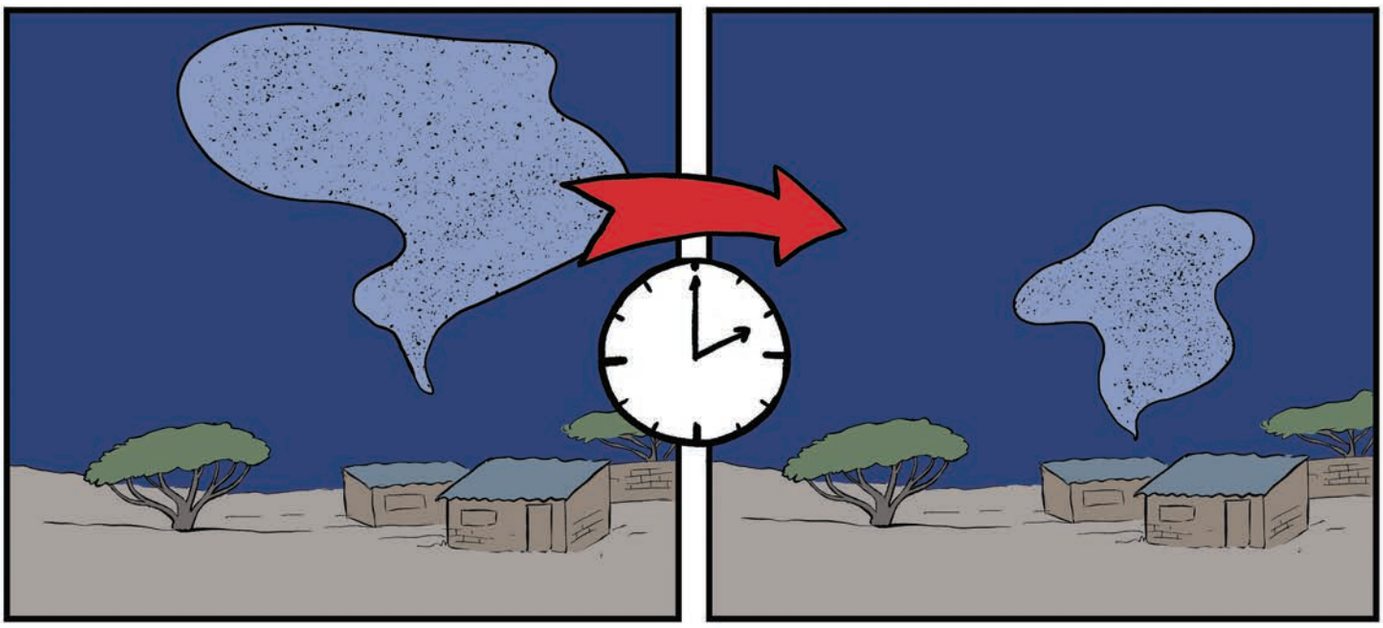
2. .....

3. .....

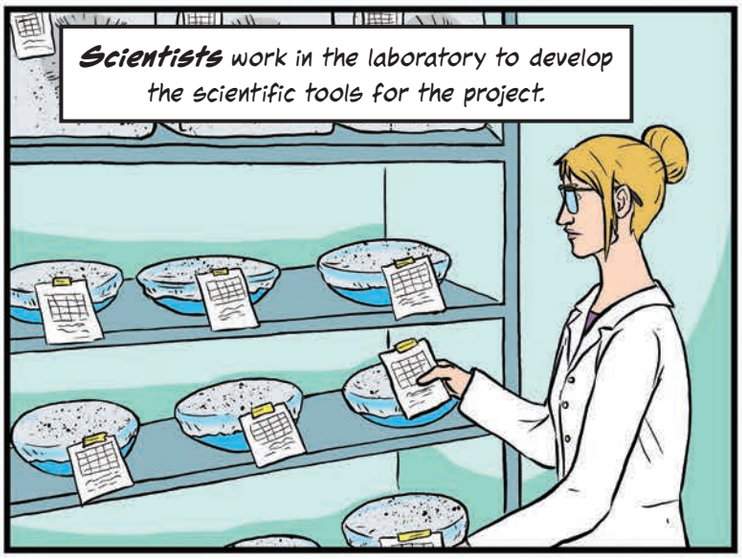


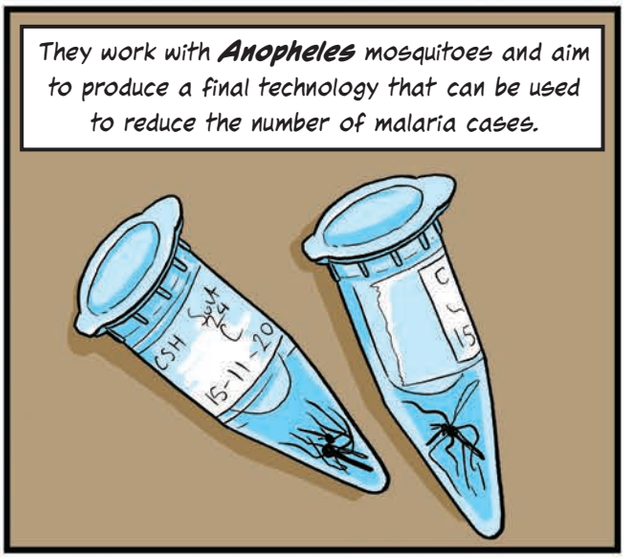


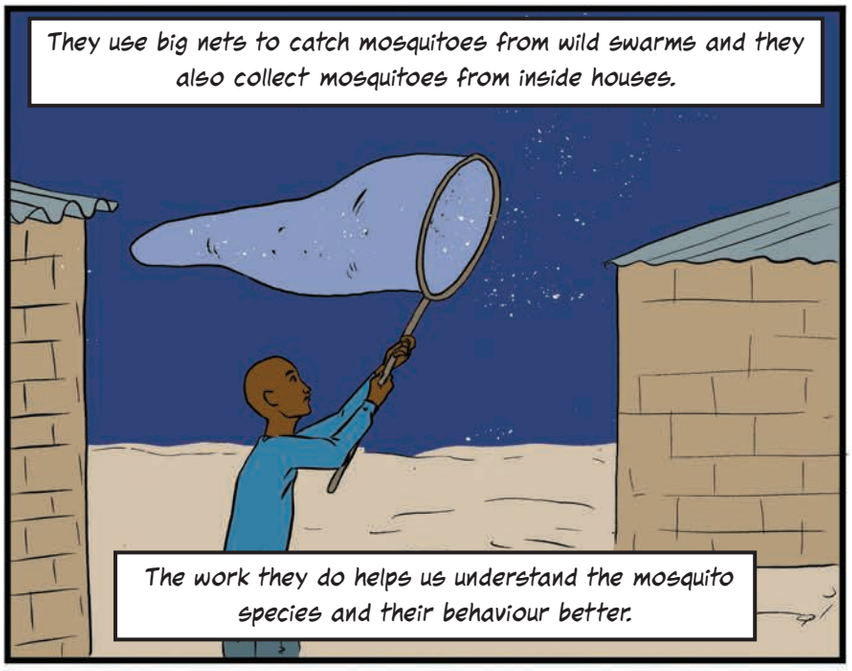
The aim is to modify reproduction in a way so that when the modified mosquitoes breed, the population reduces in size over time. This means there will be fewer mosquitoes that can carry malaria.

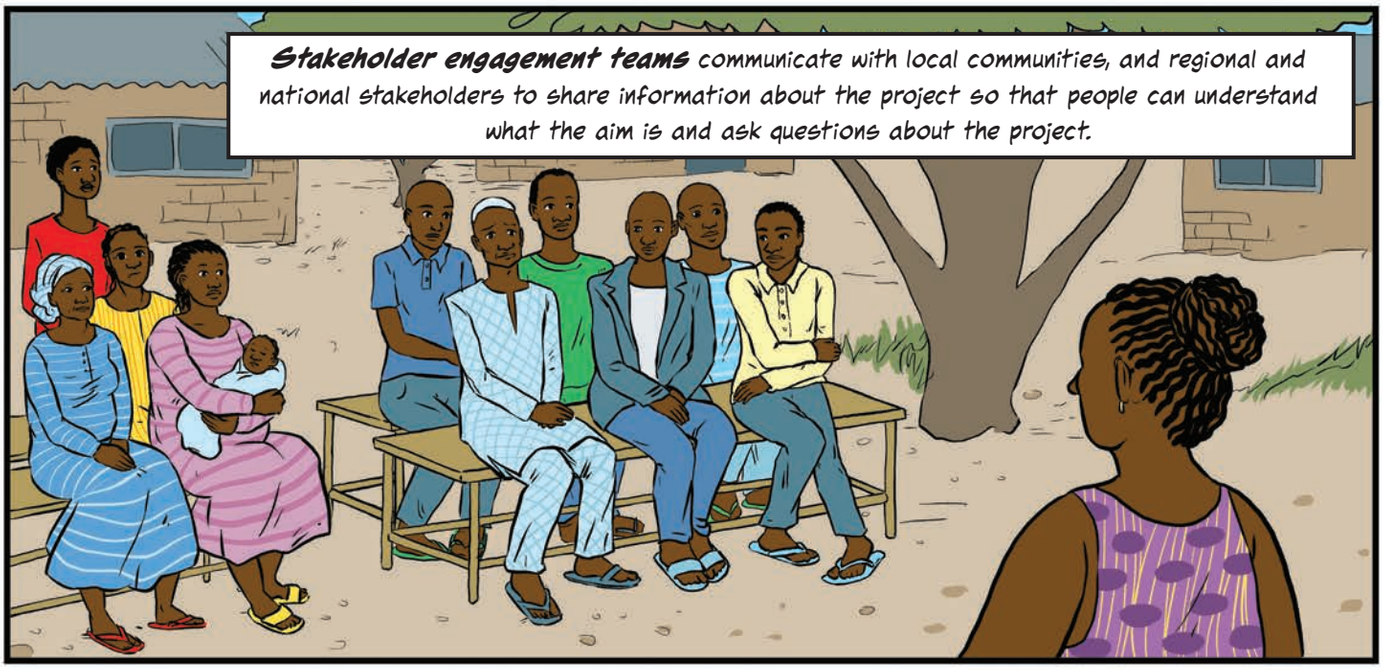


Everyone in the Target Malaria team helps with different aspects of the research:









This way people are informed about what the project teams are doing so that they can have a say.


Mother!!!
Children! What did you learn at school today?
We learned about malaria!
And how to avoid it!
Really? And how would you avoid it??
Cover skin with loose clothing between dusk and dawn!
Keep using bed nets when you sleep!
Cover open water sources that you do need!
Get rid of puddles or pools of water that you don't need!
Malaria continues to be a problem and a widespread disease, so remember to always continue with personal protection.
Remind your friends, family, and teachers to do the same.