Mosquitoes and Malaria
Hello! My name is Aisha.

And my name is Adam.

This booklet is about malaria, and the mosquitoes living here in Africa that transmit it between people.

With our friends, we learn all kinds of information from our teacher, like where mosquitoes live, which ones transmit malaria, and how research about them may give us new control tools to use against them one day in the future.
Hey Aiisha and Adam! What's wrong?

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

What's wrong?

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!
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.

Malaria is a disease caused by a parasite called *Plasmodium*. The parasite is transmitted by female *Anopheles* mosquitoes into the blood where it multiplies to high numbers. It causes high fever, shaking, chills, and flu-like illness.

Most malaria cases occur here in Africa.
Males don’t need a blood meal – they drink nectar from plants instead.

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?

Are there any other differences?

There are many, but these are the easiest for us to see.
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.

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.
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
- Indoor residual spraying
- Insecticide-treated bed nets
- Insecticides
Target Malaria is a group of researchers that works across the world in the UK, Italy, the USA, Burkina Faso, Mali, Uganda, and Ghana.

But malaria is still a big problem because:

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

The mosquitoes have developed some insecticide resistance...

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.

With our project, we want to reduce the number of mosquitoes that carry malaria. If the number of mosquitoes carrying malaria is reduced, then the number of malaria cases in humans will fall.

To reduce the number of mosquitoes carrying malaria, Target Malaria’s scientists are aiming to modify malaria mosquito reproduction.
Stakeholder engagement teams communicate with local communities, and regional and national stakeholders to share information about the project so that people can understand what the aim is and ask questions about the project.

Scientists work in the laboratory to develop the scientific tools for the project. They work with *Anopheles* mosquitoes and aim to produce a final technology that can be used to reduce the number of malaria cases.

Entomology teams collect lots of data about mosquitoes in the wild around the villages where the project works in Africa. They use big nets to catch mosquitoes from wild swarms and they also collect mosquitoes from inside houses. They also catch them to bring back to the lab for analysis. The work they do helps us understand the mosquito species and their behaviour better.

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