**Malaria Unit – Overview and Teacher Notes**

In this ten-lesson unit, students will learn about malaria, how, when, and where they are most likely to contract it, as well as prevention, and treatment. The ten lessons are as follows:

1. Lesson 1 - What is malaria? How do you get it?
2. Lesson 2 - Where are you most likely to get Malaria?
3. Lesson 3 - When are you most likely to get malaria?
4. Lesson 4 - Who gets it?
5. Lesson 5 - What are the symptoms?
6. Lesson 6 - Why is it a problem?
7. Lesson 7 - How do you prevent malaria?
8. Lesson 8 - How do you treat it? Is there a vaccine?
9. Lesson 9 - Malaria for the Future
10. Lesson 10 - Review

Teachers are encouraged to plan to do two lessons in a class period, since some of these lessons are short and focus on a small piece of the subject. Also, mentors should adapt these lessons as they see fit. Some student populations may need more time, some may need less. Some may already have a fair bit of knowledge, some may have none. Adapt your support role accordingly.

**Lesson 1: What is Malaria? How Do You Get It?**

In this lesson, students are introduced to malaria and are asked to share what they already know about it. Animations show how people get sick from contracting malaria from mosquitoes, and allow students to watch as cells get sicker, too. Students will learn the 'malaria basics' in preparation for the next nine lessons. The lesson ends with a review and discussion of what they learned.

- Begin by asking students what they think malaria is to see if the some of them already know something about it.
  - Discussion- Type their answers and compare them with a friend, then come together as a class and discuss as a class what each of the kids think that malaria is. Make a class list. Mentors should encourage students to talk openly about malaria.
- Very simple introduction to what malaria is.
  - Malaria is a disease that is caused by the bite from a very specific type of mosquito.
  - Pictures of the type of mosquito that causes malaria.
  - Activity 1 – Students circle the infected mosquitoes.
  - Activity 2 – students sort infected and uninfected mosquitoes.
- Show mosquito flying toward person – show cell infection.
o Animation- Mosquito flies toward a person and when the mosquito reaches the person the person gets sick.

o Animation- Infection enters the person and makes the cells get sick.

- Activity- Students sort sick people from well people. Send the sick people to the hospital.
- Review
  - Students write what they learned.
  - Mentors should encourage students to share their lists.

**Lesson 2- Where are you most likely to get Malaria?**

In this lesson, students will learn about the types of environments where mosquitoes live and breed and look at maps of the world to discover where mosquitoes infected with malaria are likely to be. They are asked to locate where they live on the map, and make an assumption about whether they are likely to live in an area that supports mosquitoes infected with malaria or not. The lesson ends with a review and discussion of what they learned.

- This lesson begins with the types of environments where mosquitoes live.
  - Why do mosquitoes like some climates more than others?
    - Activity – Students make predictions about where mosquitoes live by dragging the check mark to the environments most likely to have mosquitoes.
    - Mosquitoes must breed and lay their eggs in standing water in warm environments. This is why they like to live in places that are hot and humid.
    - Activity- Students draw a mosquito-friendly environment.
  - Students use their knowledge of geography to help pick which places in the world are most likely to have malaria infected mosquitoes.
    - Activity- Students use the paint bucket tool to color in those countries where they think malaria might be the most prevalent.
    - Following pages shows the fully colored map, and ask students to locate where they live on the map and discuss with a classmate. Mentors are encouraged to continue the discussion about the map, where they live, and what the map means to the students.
      - Mostly sub-Saharan Africa.
      - After sub-Saharan Africa the most affected countries- India, Brazil, Sri Lanka, Vietnam, Colombia, Solomon Islands
- Students take a second look at where malaria infected mosquitoes are likely to live.
  - Activity - Students choose which of the habitats/areas within the country they think are more likely to have mosquitoes
  - More common in rural areas than cities
- Make sure students know that just because they might live in these places doesn’t mean that they are going to get malaria, it just means that there is a higher likelihood of becoming infected.
  - If mentors are teaching a country where malaria is prevalent this could be a good time for some student/teacher, student/student discussion of the following: Do you know anyone who has or had malaria? Who are they? This can bring a personal connection to the lessons.
- End the lesson with a review of what they learned today.

**Lesson 3 - When are you most likely to get malaria?**

In this lesson, students learn that morning and evening hours are when the mosquitoes that carry malaria are the most active and likely to bite.

- When are you most likely to get it?
  - Activity - The slider controls the height of the sun above the horizon. As the sun rises, some of the mosquitoes disappear. As the sun sets again, more mosquitoes appear.
  - Discussion - Students write down what times of day they think they would be more likely to get malaria. Mentors should encourage open participation and lead a class discussion about when you are most likely to get mosquito bites that might carry malaria.
    - Animation - Reinforce the times of day with the sun rising and sun setting animation.
    - Game - Students click on the sun, moon or rising/setting sun to reinforce the times of day when they should make sure to watch out for mosquitoes.
    - Game - Rank order the amount of risk relative to the time of day.
    - Game - Find the suns that are rising/setting.
    - Game – Use the joystick to help the person run away from the mosquito. If the mosquito stings the person four times, the person gets sick and the game is over.
  - The lesson ends with a review of what they learned.
Lesson 4- Who gets it?
In this lesson, students reinforce previous lessons, and learn that some people are at higher risk of becoming ill than others. In particular, very young children, very old people, pregnant women and people who are already sick are at a greater risk of developing malaria once bitten by a mosquito. The lesson ends with a review, as well as a bridge to future lessons. Students brainstorm ways that they might protect vulnerable people from contracting the disease.

- Begin with a recap of what they learned in the last lesson- students now know which countries are the most affected by malaria, this lesson expands on that to teach them who is most likely to get malaria.
  - It is important to reinforce the fact that you don’t ALWAYS get malaria even though you live in a country that has a lot of cases of malaria. It is very important to make sure students understand that even though some people are at a higher risk, they won’t ALL get the disease, and just because someone is at lower risk does not guarantee that they won’t.
- What makes someone vulnerable to getting sick?
  - Activity/Discussion- Students brainstorm reasons why someone might be more likely to get any disease, not just malaria- see what they come up with. Mentors are encouraged to lead a class discussion and develop a list using input from the students.
  - Based on what the students come up with, mentors can tell if those same vulnerable people are the same that are more likely to contract malaria.
    - The people more likely to get malaria include pregnant women and children under 5. However, things like being very young, very old, or already sick also increase a person’s risk of developing serious malaria after being bitten by a malaria carrying mosquito.
- Activity- Different groups of people pictured on screen. Students choose which groups they think are most likely to get malaria based on what they have learned.
- Bridge to future lessons- Students brainstorm ways that they think they could possibly protect these vulnerable groups.

Lesson 5- What are the symptoms?
In this lesson, students learn about the symptoms of malaria. Once again, the lesson starts with a review of prior lessons. Students discuss what happens when they feel sick, then extrapolate that to brainstorm what happens when someone gets malaria. Students learn the word “symptom” and learn that malaria symptoms include fever, anemia, shivering, pain in the joints, headaches. Through activities, they learn what each of these mean. This lesson ends with a review, as well
as a brainstorm activity to get students to think about what to do if they see someone with malaria symptoms. This final activity will be a bridge to the next lesson.

- Review the infected cells concept- Animation from previous lesson where the mosquito flies towards the person and makes the person sick and then the malaria virus inside the person makes the cells sick.
  - Game- Similar to the game where the student controls the person, this game has the students controlling the mosquito trying to infect the person.
- What kinds of things happen to you when you are sick?
  - Activity- Students brainstorm different things that happen to them or other people when they are sick.
  - Explain that these are things called symptoms that your body makes to tell you something is wrong.
  - Animation- Expands on the original sick cell animation, but this time the sick cells release a symptom after they become infected with malaria.
- Transition into what the symptoms of malaria are- There are pictures and animations to go along with each of these symptoms:
  - Fever, anemia, shivering, pain in the joints, headaches
  - Activity- Students do a matching game that matches pictures which each symptom to help them recognize what those symptoms look like.
- End this lesson with a bridge into future lessons- ask students what they think they should do if they see someone with malaria symptoms.
  - They will probably come up with things like medicine or doctors or such. This discussion will plant another seed for a future lesson when mentors can draw upon this lesson.

Lesson 6- Why is malaria a problem?
This lesson begins with a review of what was learned in lesson 2 (Where are you likely to get malaria?). Students will learn that it is not like catching a cold or getting the flu. Malaria is a problem because it never goes away, and if not treated properly, can kill you. Malaria is also a problem because of the number of people affected by it.
- Begin with a review of Lesson 2- Mentors ask what they learned and what they remember about which places have the worst problems with malaria. Review the map with the countries colored in red, yellow, and green. Also ask if they remember who is most likely to get malaria.
After connecting where and who, see if students can come up with reasons why it would be a problem.

- Activity- Students list some of the reasons that they think malaria is such a big problem. Mentors lead a class discussion.
- Students learn that two of the largest problems with malaria is that (1) it never goes away and (2) it can kill you if it is not treated properly

Another reason why it is a problem is because of the number of people it affects.

- Activity – Students either look up or are given the percentage of people who have malaria in their area. (If the lesson is given in a place that has no malaria, pick a country and look up the statistic.)
  - Students calculate the number of students in their class who are likely to get infected based on that percentage
  - Reinforce the lesson on percents. Discuss the number in terms of 10 and 100 (i.e. 30% means 3 out of 10 or 30 out of 100).
  - Focus not only on the number of people who get it but the number of people who don’t get it.
  - Make sure students understand that percentages do not mean that 30% WILL get it, but 30% is an average. Be sure to help them understand that mitigating risk will help put them in the group that WON’T get it.
- Discuss how the numbers work on several levels with different groups of people and small groups vs. entire countries.

Finish this lesson with a review. Mentors should emphasize that while malaria can kill you, it can be controlled with medicine. It is the leading cause of death in young children in some parts of the world, but there are positive actions to take to prevent it. This will bridge to the next lesson.

**Lesson 7 - How do you prevent malaria?**

This lesson begins with a review of earlier lessons: when and where you are most likely to get malaria. In this lesson, students learn prevention measures. It also includes activities and discussions about how students can mobilize their parents to help take prevention measures. This lesson is probably the most important lesson of all ten in this malaria unit. Mentors may find that dedicating an entire class period to this one lesson is worthwhile – rather than doubling up on another lesson in this unit.

- Review what was learned in the early lessons about when and where you are most likely to get malaria. Also remember lesson three when they brainstormed ideas about how to protect the groups of people who were most likely to get malaria
o Animation- Re-uses the same animation found in lesson 3 where the number of mosquitoes increases and decreases with the height of the sun in the sky.

- Discuss: How do you think we could stop the spread of malaria?
  - Activity- Students connect what they know about how malaria is spread with ways they think they could stop it from being spread. Some students may already know some of the ways to prevent it. Mentors should encourage students to peer teach.

- After the students commit to their own ideas, the lesson focuses on three different ways of preventing malaria:
  o Insecticide treated mosquito nets
    - When would be it be most useful to use the mosquito nets?
      - Activity- Students choose which times of day from pictures it would be best to use mosquito nets based on the number of mosquitoes.
      - Advanced Option- Students choose when to use mosquito nets based on the position of sun in the sky.
      - Game- Students put nets over the beds so that the mosquitoes don’t get in.
  o Indoor Residual Spraying - These chemicals are like the special chemicals that are sprayed on the nets but they are chemicals that people spray around their home because the mosquitoes don’t like them and stay away.
    - Animation- Shows chemicals coming out of a can and mosquitoes flying away.
    - Game- Students spray the chemicals over their beds and around their homes to make the mosquitoes go away.
  o Preventative Medicine - There are medicines that people can take before they go to places with lots of malaria that prevent the disease.
    - If the Internet is available, students may wish to visit the following site, which has helpful information about preventative options. [http://www.stopmalarianow.org/malaria_control.html](http://www.stopmalarianow.org/malaria_control.html)

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**Lesson 8- How do you treat it? Is there a vaccine?**
This is the first lesson that draws upon everything that the students have learned in the first seven lessons. They now know what, where, when, and who gets malaria. They know the symptoms, why getting it is a problem, and they know the ways to prevent the spread of malaria. In this lesson, students will review who is likely to get it, and tie that in with treatment and prevention.
Review – Students review what was learned in lesson four when they were brainstorming what to do if they thought that someone had the symptoms of malaria. Mentors are encouraged to help students understand that the information about treatments goes hand in hand with what they can recall from the lesson on symptoms.

Medicines - Students learn what medicines are available for which symptoms.
  - Animation – Students learn about the different kinds of medicine with a fun animation that shows different malaria medicines pouring out of bottles.
  - Game - Students give the right medicine to the various people who are sick with malaria.

When to take medicines – Students discuss when it is most important to take malaria medicines. They learn that medicines work best before the person gets very sick. Using medicines to prevent malaria in the first place is also reviewed at this time.
  - Game- Students play another version of the previous game with different levels of sickness.

Discuss immunity to diseases and why some people don’t get it after they have been infected with it.
  - Animation – Lesson shows the same animation with the mosquito and the infected cells but now the mosquito can’t infect the cells because the cells have a wall to protect them.
  - Advanced Option- deal with sickle cell anemia and why people who have it are less likely to be severely affected if they get malaria.

Review Quiz – Students will take a quiz that begins to review all of what was learned in the past 8 lessons.

Discussion – Students work in pairs to review and peer-teach what was forgotten or missed on the quiz. Mentors are then encouraged to lead a class discussion to begin to review all the concepts.

Lesson 9- Malaria for the Future
This lesson begins with a review of key concepts from lessons 1-8. Then the lesson turns its focus on containment and eradication. This lesson shows that countries around the world have successfully eradicated malaria, or reduced its impact with containment measures. It includes a discussion about why the Dominican Republic and Haiti, which both share an island, can have such different risk factors in contracting malaria.

What are people like scientists and doctors doing to stop the spread of malaria?
Drugs - there are many efforts to make new malaria drugs that will help fight malaria.

Vaccine - there is a vaccine called RTS,S/AS02A vaccine that is being tested right now to help prevent malaria.

Research – If an Internet connection is available, have students visit http://www.stopmalarianow.org/research.html where they can view what others are doing to stop malaria.

- Success stories
  - Animation - Students are presented with the same map animation with all of the mosquitoes shown in Lesson - show the kids the numbers from something like 10 years ago and then show them the same animation with the numbers from this year, see if they can recognize the difference!
  - Map/Discussion – Students see a map of the island of Hispaniola, with Haiti in red and the Dominican Republic in yellow. Discuss why the same island might have different risks of malaria. Ask if they think that containment and eradication methods really work. Why or why not?

- What are you and people like you doing to stop malaria from being spread?
  - Discuss – What are you going to do to help prevent the spread of malaria? Students will make a list of at least three things they will try to do, or ask their parents to try to do.
  - Mentor led discussion – Mentors should encourage the students to tell others about what they have learned about malaria and how to prevent its spread, and encourage students to share their action plans with the class. Create a class list of action items. Ask students to come back “tomorrow” and share their home discussions and family action plans with the class.
  - The Promise – Students finalize their family and personal action plan, add it to their book and sign the book as a sign of their personal commitment to help eliminate malaria.

Lesson 10- Review
This lesson is a review of all ten lessons. This lesson includes multiple games setting up different situations where students either help prevent or treat malaria. A final quiz at the end will be the culminating activity for all the lessons.