Defining the Research Problem

You now have a better understanding of your personal and team's identity and knowledge about mosquitoes. That information will be useful as you begin to define the mosquito problem in your local community. So keep those identity maps safe for later use.

Objective

In this task, the team will meet some researchers who study the mosquito problem to learn more about different parts of the problem. These researchers will give the team some ideas about the things you should consider when doing research in your local community.

1. Go to the Task 1-6 folder to get the instructions and readings.
2. Watch the videos if you can. Do not worry if you are not able to.
3. As a team, read the Problem Introduction together.
   - During the reading, circle or underline all the words you do not understand.
   - Do not worry, there are many big words in science.
4. As a team, make a list of all the words people circled or underlined so we can start to help each other better understand them all.
5. Make a plan for how we could learn more about what these words mean.
   - Where could we search or whom could we ask to learn more about these words?
6. Go back and identify a Very Important Part (VIP) from the reading.
7. Share these VIP's as a team.
8. Follow the instructions for the Meet the Team - Jigsaw Part One.
9. Have each group present their researcher to the team, including:
   - Name, job title, organization
   - Most interesting thing from their identity map
Task 1-6

- One VIP from each of the three questions
- Make a list of the VIPs from all groups

Follow the instructions for the Meet the Team - Jigsaw Part Two.

10. Have each group present their researcher to the team, including:
   - VIP for each perspective (ethical, economic, social, environmental)
   - VIP for why it is important to consider perspectives when making decisions about this problem
   - Make a list of the VIPs from all groups

To help your local community, we will need your team to create a research site and develop a variety of suggestions for solutions to this question:

How can we ensure health for all from mosquito-borne diseases?

Just remember, research is not always easy. There is not one right answer. There are many possible solutions. So, you might get confused. You might get frustrated. Things might not always work out the way you thought.

This is normal. All you can do is try again, start over, ask a different question, talk to a different person, or create a new pathway.

Just remember, there are many questions to consider. There are many decisions to make. There are many possible solutions.

Hooray! You completed Task 1-6. Check it off the task list. Go to Task 1-7!
Task 1-6 Defining the Research Problem

Introduction Videos

If the team is able to watch a video, start with one of the videos in the Learning Lab Task 1-6 folder. Do not worry if you are not able to watch videos. You can go straight to the reading.

Problem Introduction

Mosquitoes are all around us. Mainly during the warmer season, their constant buzzing follows you when you step outside. They leave itchy red bumps on your skin. They buzz in your ear when you sleep. They are unavoidable and annoying.

In addition to being annoying, some female mosquitoes feast on your blood—most of the time without you noticing. In some places, a sleeping human can be bitten many times in a night without noticing. Female mosquitoes need the blood to make eggs. These eggs grow into more mosquitoes. More mosquitoes mean more buzzing and more blood sucking. These mosquitoes are good at surviving around humans.

However, itchy bumps and annoying buzzing are not the only problems. Mosquitoes are very good at carrying and transmitting some diseases. Sometimes, when mosquitoes suck on your blood, they also inject a pathogen that transmits disease to your body. The diseases they carry are called mosquito-borne diseases. You may have heard of these diseases. They include malaria, dengue fever, Zika, West Nile virus, yellow fever, chikungunya, and encephalitis.

There are many people interested in studying and learning more about mosquitoes and the diseases they spread to humans. Let us meet some of these people to learn more about the mosquito problem.

Meet the Researchers: Jigsaw Part One Instructions

1. Divide the group into six groups.
2. Assign each group one of the team member profiles from the Meet the Team reading. The profiles are Rusty Low, Meera Venkatesan, David Pecor, Kelly Bennett, Bridget Giles, and Lee Cohnstaedt.
3. Each group is responsible for reading about one researcher.
4. When reading, complete the following in each group.
   a. Each group member should read the first page about their researcher to themselves.
   b. Have one group member read the entire reading out loud to the rest of the group.
   c. Each group member should go back and identify a Very Important Part (VIP) from each section of the first page.
i. Identify one thing on the researcher’s identity map you find most interesting.

ii. Why is the mosquito problem such an important issue for people to understand?

iii. Briefly describe the researcher’s work on mosquito-borne diseases.

iv. How much is still not known about mosquitoes and mosquito-borne diseases?

d. Circle or place a sticky note on what each group member thinks is the most important part of the reading.

e. In your group, have each person share their VIPs with the group and their reasons for selecting them and the item on the researcher’s identity map.

f. As a group, summarize the VIPs from your group and your thoughts on the identity map.

g. Make sure each group member is ready to share their VIPs with the rest of the team.

**Meet the Researchers: Jigsaw Part Two Instructions**

1. Each group is responsible for reading the second page about their researcher.

2. When reading, complete the following in each group.
   a. Each team member should read the second page about their researcher to themselves.
   b. In each group, have one group member read the entire reading out loud to the rest of the group.
   c. Each group member should go back and identify a Very Important Part (VIP) from each section of the second page.
      i. Identify one VIP from each perspective (Ethical, Economic, Social, Environmental)
      ii. Why is it important to consider various perspectives when making decisions on the problem question: How can we ensure health for all from mosquito-borne diseases?
   d. Circle or place a sticky note on what each group member thinks is the most important part of the reading.
   e. In your group, have each person share their VIPs with the group and their reasons for selecting them.
   f. As a group, summarize the VIPs from your group and your thoughts on the four perspectives.
   g. Make sure each group member is ready to share their VIPs with the rest of the team.

*Go back to Research Guide now*
RUSTY LOW

SENIOR EARTH SCIENTIST

Why is the mosquito problem such an important issue around the world?

Mosquitoes are the most dangerous animal on the planet for humans! Mosquito-borne diseases affect half a billion people every year. Mosquito borne diseases kill up to a million people every year. Climate change is now affecting where some mosquitoes can live. These changes mean some mosquitoes and diseases move into new places. Many of these places have not had mosquito or disease problems recently. We have learned that all places must be prepared for this problem in the future.

Provide a brief description of your work on mosquito-borne diseases.

I have been working on developing the GLOBE Observer Mosquito Habitat Mapper. It is an app for smartphones and mobile devices. The app allows kids and adults to locate sites in their community that mosquitoes might like. People can share this information with one another. Then they can find out if the mosquitoes are the type that transmit diseases. The data is shared with the science community to help make decisions around the world. It is a fun way to use science to make a difference locally!

How much is still not known about mosquitoes and diseases in your field of work?

We still do not know many things about mosquitoes. That means there are many opportunities for citizen scientists like you. We need your help to conduct local research. This research will help us all better understand mosquitoes. It will also help us know where they live. Most of our understanding of mosquitoes comes from laboratory research. This is why we need the help of teams like yours. We need teams around the world to come together. We must share information about what is happening outside of the laboratory. We must share what is happening in our local communities. This will help us all learn more about this problem.
Why is it important to look at the mosquito problem from different perspectives?

**Ethical**

We must think about the ethical parts of the mosquito problem. “Ethical” means the fairness of something. Is it okay that some people are at greater risk from mosquitoes than others? Is it okay that because of factors out of their control, they are at more risk? These are all questions we must ask.

**Economic**

We must think about the economic parts of the mosquito problem. “Economic” is concerned with money, income, and use of wealth. Citizen scientists like you can provide economic support in your community. Many communities do not have the money to have good mosquito surveillance. The data from citizen scientists like you can help authorities make tough decisions - for example, decisions about where to spray expensive insecticides to keep mosquitoes away.

**Social**

It is important to consider the social part of the mosquito problem. “Social” is concerned with the interaction of people in a community. People must work together to create and maintain protection from mosquito-borne diseases in the community. Do some people have a greater risk of disease? Why or why not? These are questions we must ask.

**Environmental**

It is important to understand the environmental parts of the mosquito problem. “Environmental” is concerned with the natural world. It is also concerned with human impacts on the natural world. What things can help mosquitoes reproduce? How can we identify these things? How can we use this information to reduce disease risk in the community? These are questions we must ask.

Why is it important to consider a problem from various perspectives (social, ethical, environmental, economic) when making decisions and developing solutions to problems?

I was trained as an Earth system scientist. System science looks at the connections between different parts of a larger system. For example, climate change is a large system. It cannot be understood without looking at how the changing climate affects the different parts. Some of the parts are the ocean, living things, the land, and ice. You must look at the connections of these parts to have a better picture of the whole system.

We also live not only in our physical environment, but in our social one. When considering a problem, we need to think about the social and environmental parts of the problem. It is very hard to predict the outcomes of changes in either part. This is why models are so useful to scientists and social scientists. When you are trying to solve problems, you need to think about each part and how the parts all work together.
Why is the mosquito problem such an important issue for people to understand around the world?

The mosquito is the most dangerous creature on the planet. It causes thousands of deaths. It also makes people, often children, very sick. Even if it is not a problem where you live, it can still have a huge effect on people. One thing we have learned recently is that mosquito-borne diseases can occur anywhere. They also move quickly across the world - even into places we did not think mosquitoes could survive. Sometimes, diseases like Zika or chikungunya emerge in places they were not seen before. So, we all must prepare for the future.

Provide a brief description of your work on mosquito-borne diseases.

I work on improving the control of malaria. Malaria is the most deadly mosquito-borne disease. Malaria kills around 500,000 people per year. Most of these deaths are kids living in Africa. Luckily, we have many tools to fight malaria that work. The task now is getting them to people in need. We also need them to be used by people at risk. These tools include:

- Tests to know when you have malaria
- Treatments that help sick people
- Bed nets to sleep under
- Spraying insecticides on the walls of homes to keep mosquitoes away

I work at USAID for the President’s Malaria Initiative. My work helps countries in Africa and Asia. My work helps these countries with their own local malaria control programs.

How much is still not known about mosquitoes and mosquito-borne diseases in your field of work?

Many mosquito control projects are growing in Africa and Asia. However, there is still a problem of the “left over” spread of disease. Mosquitoes that still live in a place can cause problems. Mosquitoes that are resting and biting outdoors where people are not protected can cause problems. The malaria research community is working hard to figure out how to target these mosquitoes. They are also working hard to learn how to protect people from being exposed to infected bites. Exposure can happen when working, sleeping, or spending time outside. This is where we need the help of teams like yours. When teams come together, we can learn more about this problem. This will help us create solutions that work better for different communities.
Why is it important to consider a problem from various perspectives (social, ethical, environmental, economic) when making decisions and developing solutions to problems?

You must make sure you can get participation from all parts of a community or country. Mosquito-borne diseases should not be seen just as a health issue. They are also an economic issue. You can engage with the finance and private sectors to get involved and increase your impact. In addition, you must work on environmental issues with the agricultural sectors of your community. This will ensure that everyone has the same goals. It will also help make progress on health, food, nutrition, and environmental protections.

**Ethical**

We must think about the ethical parts of the mosquito problem. “Ethical” means the fairness of something. First, we must not ignore the people who are at great risk from mosquito-borne diseases. These people may be the hardest to reach or get involved. We have a duty to be fair. We must make sure they are not forgotten. We must be fair to all people. We must provide all people the safety and medical help the rest of the population enjoys.

**Economic**

We must think about the economic parts of the problem. “Economic” is concerned with money, income, and use of wealth. Getting sick from mosquito borne diseases costs people large amounts of money. This is felt at the household, community, and industry level. It is important to show people how much can be gained economically by reducing the problem of mosquito-borne diseases. We must also convince people that there are more than just health benefits. A country may grow faster and improve the economic status of its people by reducing malaria. People can save money when they are no longer spending money getting care from doctors. They can save money by not missing days of work and school due to malaria illness.

**Social**

It is important to consider the social part of the problem. “Social” is concerned with the interaction of people in a community. People must work together to create and maintain protection from mosquito-borne diseases within the community. The community includes leaders, parents, and children. The community needs to understand the importance of fighting these diseases. The community is needed to successfully implement solutions at the local level. If the people in a community are not involved, you will not get very far with any solutions or changes.

**Environmental**

It is important to understand the environmental parts of the problem. “Environmental” is concerned with the natural world. It is also concerned with human impacts on the natural world. For example, any insecticide that is used to fight mosquitoes first must go through rigorous tests. The tests should determine potential environmental effects on all parts of the natural world. These tests should ensure the insecticides are safe to use. Plans must make sure that exposure of the environment to chemicals is reduced.
Why is the mosquito problem such an important issue for people to understand around the world?

There are almost no places you will not experience some impact from mosquitoes, besides Antarctica. In many places they are just annoying biters. In other places, they carry diseases. There is no escaping them. Although mosquitoes are found nearly everywhere, individual species distributions can change dramatically over time. Humans spread mosquitoes around the world via travel and trade. Climate change may also cause mosquitoes to move into new areas. Many places are currently free of mosquito-borne diseases. This does not mean they are completely safe in the future. If an infected person is exposed to the local mosquitoes, the diseases can be spread to people who are not aware of these diseases.

Provide a brief description of your work on mosquito-borne diseases.

I primarily work on the VectorMap project. This is an online source for mosquito collection data. It also includes information about the places mosquitoes like to live. It is designed to permanently store data associated with mosquito observations. This is similar to a museum that is tasked with permanently protecting samples. The goal is to determine the risk of mosquito-borne diseases in different places. It also helps us monitor how the problem may be changing over time. It is important to capture as much detailed observation data as possible.

How much is still not known about mosquitoes and mosquito-borne diseases in your field of work?

There are many things to discover in this field. There are more than 3,600 known types of mosquitoes. Many of these and more have not yet been described. The impact of many of these mosquitoes on humans is also unknown. Another thing we do not know is the number and nature of the diseases that have not been described. Diseases in nature could spill over into humans via mosquitoes. One of the biggest challenges in this work is providing access to the tools to combat mosquito-borne diseases, mainly for the people who need it most. Mosquito-borne diseases unfairly affect people living in the developing world. This is because many of these diseases are common to tropical and sub-tropical climates (Africa, South America, Southeast Asia). For this reason, access to tools, education, and training must be provided to people with the greatest risk.
Why is it important to look at the mosquito problem from different perspectives?

**Ethical**

We must think about the ethical parts of the mosquito problem. “Ethical” means the fairness of something. I believe countries with technology and education related to mosquitoes have an ethical duty. These people must share that knowledge with the developing world. This is because the disease problem is much greater for people living in developing countries. We must help them solve the biggest issues surrounding mosquito control.

**Economic**

We must think about the economic parts of the problem. “Economic” is concerned with money, income, and use of wealth. No other animal has affected human economics more than the mosquito. Mosquitoes have been responsible for countless lives lost over our history. Even now, mosquito control strategies are expensive (for example, pesticide development, spraying insecticides, digital mosquito monitoring tools, etc.).

**Social**

It is important to consider the social part of the problem. “Social” is concerned with the interaction of people in a community. Community participation is a big part of mosquito reduction. The community must understand that mosquitoes can use human products left outside. Therefore, making it socially unacceptable to leave out trash is one step in addressing the problem.

**Environmental**

It is important to understand the environmental parts of the problem. “Environmental” is concerned with the natural world. It is also concerned with human impacts on the natural world. Mosquitoes play many important roles in the places they live. Mosquitoes help many plants survive. They are also food for other animals, such as birds, bats, and fish. In many communities, mosquitoes are all considered bad. However, there is growing evidence that they have more value in nature than we typically give them credit for.

Why is it important to consider a problem from various perspectives (social, ethical, environmental, economic) when making decisions and developing solutions to problems?

Solutions that only address single or limited perspectives are unlikely to be successful. I believe an integrated approach to problem-solving is essential, especially when dealing with hard problems like mosquitoes and mosquito-borne disease. This problem is universal and affects everyone. We must consider multiple perspectives to ensure solutions help everyone involved.
Why is the mosquito problem such an important issue for people to understand around the world?

The problem of mosquito-borne disease has been greatly affected by increased human movement and trade around the world. This human movement has allowed these mosquitoes to travel and establish new places to live. In addition, people are having increased contact with forests. As humans urbanize their surroundings, diseases can switch from using animals to using humans as a host. This worldwide network of invasion and increasing urbanization is a big part of the problem. It means we must work together as one to reduce the introduction of mosquitoes into new places. Mosquitoes tend to be highly adaptive. New diseases are also emerging and spreading rapidly. A recent example is Zika virus. This disease has been around for a long time. Yet only recently has it become a world-wide problem. This is likely due to the mosquitoes adapting to their surroundings. These mosquitoes are adapting to take better advantage of humans.

Provide a brief description of your work on mosquito-borne diseases.

I am currently working on two projects focusing on the Aedes mosquito in Panama. These mosquitoes can transmit dengue, chikungunya and Zika virus. The first goal of my work is to identify whether mosquito populations in Panama are adapting to their local environments. We also are trying to learn how these populations are connected. This is important to understand when thinking about mosquito control efforts in Panama. In the second project, I am investigating the natural strains of Wolbachia bacteria. Infection with this bacteria can affect disease transmission in mosquitoes. However, whether the bacteria effectively reduces transmission depends on the interaction of Wolbachia strains. Therefore, it is important to understand which strains are naturally present. This is helpful to determine whether such control methods would work in Panama.

How much is still not known about mosquitoes and mosquito-borne diseases in your field of work?

Relatively little is known about even basic life and behaviors. We must learn more about things that contribute to disease risk and how mosquitoes transmit diseases. We need to acquire information about many mosquito life history traits. These traits include mating behavior, egg-laying behavior, preferred habitats, seasonal differences in amount of mosquitoes, distribution, host preferences, development, and competition between and within species. All of these factors contribute to disease risk. The greatest challenge is to bring all the expertise together to understand how to control mosquito-borne diseases.
Why is it important to look at the mosquito problem from different perspectives?

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<th>Ethical</th>
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<tr>
<td>We must think about the ethical parts of the mosquito problem. “Ethical” means the fairness of something. There are many new and alternative mosquito control methods currently being researched. Many of these new methods raise ethical concerns. For example, releasing genetically modified mosquitoes into the wild. Should we do this? We must think about the ethical side of all decisions we make.</td>
<td>We must think about the economic parts of the problem. “Economic” is concerned with money, income, and use of wealth. Many countries suffer from a large economic burden due to mosquito-borne disease. This burden puts pressure on medical facilities and health workers. It also requires large amounts of money to support these facilities and sick people. Many of these places must also spend money on mosquito monitoring and control.</td>
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<th>Social</th>
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<tr>
<td>It is important to consider the social part of the problem. “Social” is concerned with the interaction of people in a community. For example, people in many areas of the world do not have a piped water supply to their home. This means people without access to a reliable water source must store drinking water, providing habitats in which mosquitoes breed. Furthermore, poor housing and garbage disposal means lower income areas have greater exposure to biting mosquitoes. Many of these areas also do not have as much access to medical facilities. This can increase the number of fatalities from mosquito-borne diseases.</td>
<td>It is important to understand the environmental parts of the problem. “Environmental” is concerned with the natural world. It is also concerned with human impacts on the natural world. Spraying insecticides is an environmental part of the problem. These methods can possibly contaminate water sources and kill other non-mosquito species. These environmental parts of the problem must be considered when making decisions.</td>
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Why is it important to consider a problem from various perspectives (social, ethical, environmental, economic) when making decisions and developing solutions to problems?

Without taking into account all perspectives, an approach is likely to fail. For example, imagine there is an effective way to control mosquitoes that requires the active participation of the local community. Without the community support, the method is unlikely to succeed. Similarly, if this hypothetical approach successfully reduces the mosquitoes but is too expensive to maintain, the approach will not be successful into the future.
Why is the mosquito problem such an important issue for people to understand around the world?

Mosquitoes are the most dangerous animals in the world. They cause millions of deaths each year. Recent changes in the climate and longer warm-weather seasons are creating more problems. These warmer temperatures create more mosquito-friendly habitats around the world. This will potentially lead to more mosquito-borne diseases including Zika, malaria, dengue fever, yellow fever and West Nile virus.

Provide a brief description of your work on mosquito borne diseases.

I lead a team of researchers. Together we developed a video game to educate families about their ability to stop the mosquito-borne disease Zika. The video game is call ZAP. ZAP stands for Zika Awareness and Prevention. The 3D simulations provide interactive education exercises about individual-level protection practices. This includes how to remove mosquito breeding sites around your home, correct use of larvicide, placement of screens on windows and doors, and how to dress to defend yourself against mosquito bites. The video game also addresses symptoms of Zika virus infection. It gives special precaution recommendations for pregnant women. Videos are included in the game. In addition, Zika trivia and matching games are provided to test knowledge.

How much is still not known about mosquitoes and mosquito-borne diseases in your field of work?

One challenge people are currently working on is a safe and effective Zika vaccine. Although pregnant women are usually excluded from vaccine research, pregnant women are at the center of the Zika epidemic. So, bioethics groups have to consider the pros and cons of including pregnant women in Zika vaccine research.
Why is it important to look at the mosquito problem from different perspectives?

**ETHICAL**

We must think about the ethical parts of the mosquito problem. “Ethical” means the fairness of something. Individuals need to discuss sensitive topics related to sexual and reproductive health.

**ECONOMIC**

We must think about the economic parts of the problem. “Economic” is concerned with money, income, and use of wealth. Public officials need to invest in mosquito control measures like aerial spraying. But this is expensive and requires money.

**SOCIAL**

It is important to consider the social part of the problem. “Social” is concerned with the interaction of people in a community. One must implement personal protective measures, such as using insect repellent and condoms, if one is living in or traveling to an area with Zika.

**ENVIRONMENTAL**

It is important to understand the environmental parts of the problem. “Environmental” is concerned with the natural world. It is also concerned with human impacts on the natural world. Individuals should regularly remove standing water around the home. Homes should also use water treatment tabs to kill larvae in standing water that cannot be removed.

Why is it important to consider a problem from various perspectives (social, ethical, environmental, economic) when making decisions and developing solutions to problems?

That is the only way to consider the whole picture of the problem. Considering the problem from various perspectives is the only way to come up with an effective solution.
Why is the mosquito problem such an important issue for people to understand around the world?

Mosquitoes are a nuisance at best and at worst the most dangerous animals in the world. Billions of people are at risk of mosquito-borne diseases every day. Globally, mosquitoes can change the landscape by influencing where animals and people live. Mosquitoes influence global production in most of the developing world. Furthermore, mosquito-borne diseases can always be introduced to a country where they were not before. This was the case with West Nile, Zika, and chikungunya viruses. Even if mosquitoes are not as abundant or a problem in the developed world, this does not mean they are not for the rest of the world or in the future.

Provide a brief description of your work on mosquito-borne diseases.

Two, four, six, eight: The USDA works to protect two-legged and four-legged animals from six- and eight-legged ones (insects and ticks). Specifically, I try to prevent outbreaks of diseases that will affect humans or animals in the United States. I do this by looking at various ways to monitor, control, or treat disease related insects such as mosquitoes or their associated diseases. The main focus of my work is zoonotic diseases, or animal diseases that may result in human illness.

How much is still not known about mosquitoes and mosquito borne diseases in your field of work?

The more we know, the more we realize we don’t know. Research always advances understanding and creates more questions. Currently there is a large amount of research on sterile mosquitoes. Other research is on genetic changes that can make mosquitoes not blood feed. However, mosquito research can also be used to address big ecological questions such as global climate change. In 2001, mosquitoes were one of the first organisms to show genetic shifts in as short as five years. Similarly, genetic flexibility allows exotic mosquitoes to adapt rapidly to new environments. There is no limit to what we need to learn or what we can learn about mosquitoes.
Why is it important to look at the mosquito problem from different perspectives?

**Ethical**

We must think about the ethical parts of the mosquito problem. “Ethical” means the fairness of something. There are many ethical questions to consider about mosquitoes. Such as, should humans intentionally kill off a species of mosquito? Or how do we protect the more than 2 billion people making less than $2 a day who are at risk of mosquito-borne diseases?

**Economic**

We must think about the economic parts of the problem. “Economic” is concerned with money, income, and use of wealth. However, the brunt of mosquito-borne illness is suffered by the poorest individuals worldwide. Providing low-cost, easy-to-use materials and methods for mosquito control is an effective way to quickly help alleviate some of the disease burden. However, this is not a sustainable plan. Only by changing the economic status of people and providing them with permanent, stable housing with screens, running water, and other basic amenities can mosquito-transmitted diseases be reliably controlled.

**Social**

It is important to consider the social part of the problem. “Social” is concerned with the interaction of people in a community. Mosquitoes are not restricted by boarders or property lines. They will move and live where the blood is. Therefore, we must all work together to eliminate mosquitoes from our communities. If one of us fails, it is up to the others, to take up the work because the mosquitoes will live where they can and then the entire community will suffer.

**Environmental**

It is important to understand the environmental parts of the problem. “Environmental” is concerned with the natural world. It is also concerned with human impacts on the natural world. Mosquitoes are clearly an environmental problem. If the larval habitats are removed, the mosquitoes will be eliminated. However, removing the environmental problem means addressing the need for the water containers. Providing clean, reliable drinking water eliminates the need to store water in containers, where mosquitoes like to breed. Environmental change alone will not solve the problem, though. That change can only happen with simultaneous social and economic change.

Why is it important to consider a problem from various perspectives (social, ethical, environmental, economic) when making decisions and developing solutions to problems?

We are humans and many things influence our lives every day. These include work, life, community, the environment, family, and friends. If we make decisions based only on one of these perspectives, the solution will only address one of these areas. Our world is complicated and consists of many parts and perspectives. Without addressing all of the parts, the solution is not likely to work with the other parts. Simple questions tend to have simple answers. However, a simple single perspective answer will likely only address the symptoms of an issue and not the problem. It can then leave other people with different perspectives answerless. For example, we may ask people to empty water containers around their houses, which is a simple task. But it takes time and effort over the other many individual needs that must be done daily. Most people do not have or do not make the time to monitor their property even weekly for mosquito larval habitat. This is likely for many social, environmental, or economic reasons. For a solution to be universally acceptable, it must address most, if not all the problems and perspectives, not just the symptoms.
Video Links for Task 1-6

The Loathsome, Lethal Mosquito
Mosquito Problem Overview

Description:
Good overview of mosquitoes and the mosquito borne disease problem.

https://youtu.be/IkmjCmvfeFI

Mosquito Hunter - Frontline Video
Description:
Good video to present overview of mosquito problem and community involvement.

https://youtu.be/0n6VtSam9To
The Zika Awareness and Prevention (ZAP) Game was developed to strengthen students and communities in their ability to stop Zika virus disease. Zika virus is a mosquito-borne virus, spread primarily by the bite of an infected Aedes species mosquito. Through simulation, this game educates students about Zika virus, common mosquito breeding sites, Zika virus disease symptoms, and pregnancy risks associated with Zika. Practices that help to prevent mosquito bites are also covered such as using an EPA registered insect repellent with DEET, the importance of wearing long sleeved shirts and long pants when outdoors, and treating clothing with permethrin. Multiple choice and matching games are provided to gauge how much you learned about Zika.

Use the following link to access the game, and have fun!
http://zika.vmasc.odu.edu/zap/

Computer WebGL Compatibility: Chrome 64 bit Version 57 and newer, Microsoft Edge version 16 or newer, Safari version 11 or newer, and Firefox version 52 or newer. Firefox users check your privacy settings.

For more information about the ZAP Game or for any other concerns please email us at Zapzika@odu.edu or contact:

Bridget Giles PhD
Virginia Modeling Analysis and Simulation Center
Old Dominion University
1030 University Blvd.
Suffolk, VA  23435
Email: bgiles@odu.edu
Phone:  757-638-4436
Team News Article Links for Task 1-6

Zika ZAP Game Bridget Giles News Article

Rusty Low Institute for Global Env. Strategies News Article

Lee Cohnstaedt USDA News Article

Kelly Bennett STRI News Article
https://newsdesk.si.edu/releases/smithsonian-scientists-track-aedes-mosquito-invasions

David Pecor WRBU News Article