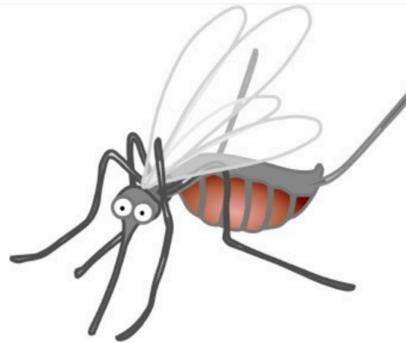


# Mosquito Investigation Notebook



Name: \_\_\_\_\_

Date: \_\_\_\_\_



## 1. Meet Your Neighbors:

Do you recognize the neighbor sitting on top of the water surface?  
(Hint: it is the most deadly creature on the planet!!)

What is the name of that organism?     Mosquito    

But what about those strange looking organisms hanging out below the water surface- what are those? Do you have some questions about them? What are you wondering about them? Finish the sentence starters below.

1. I wonder...
2. I also wonder...
3. What if...
4. Is it possible that...
5. This reminds me of....

Share your five sentences with your partner or group. You may be asked to share them with the class.

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NOTE: THIS PAGE IS NOT IN THE STUDENT EDITION. IT PROVIDES SOME EXAMPLES FOR THE SENTENCE STARTERS ABOVE:

Examples of responses to questions for Page 1:

I wonder..... What if..... Is it possible that..... This reminds me of.....

1. where this water sample came from.
2. why there so many of them.
3. why they appear to be upside down in the water.
4. if they have to live in water.
5. what they eat.
6. how they breath.
7. how they got in the water.
8. why they look so different from an adult mosquito.
9. how and when do they change
10. if those are eyes.
11. how long they spend in this form.
12. how long they spend in the water.
13. what happens to them if the water dries up or drains away.
14. if this is a kind of mosquito that carries/causes a disease.
15. if the water has to be a certain temperature.
16. if they are found in both fresh water and salt water.
17. if these can hurt you.
18. if an adult mosquito can live in water.
19. if the mosquito living in the water (like in the picture) can live in air.

What if.....

1. the water was removed?
2. they were not upside down but right-side-up?
3. the water was dirty?
4. the water was very cold or very hot?
5. all mosquitoes disappeared from Earth?

Is it possible that....

1. these can kill a person?
2. these have been in the water that we have used in our house?
3. these could live in hot water, cold water, frozen water, dirty water?
4. these can see me?
5. that other organisms eat these?

This reminds me of....

1. All answers here will depend on student experience.

*\*\*\*Below is the BIG QUESTION that you should be able to answer when you finish this investigation notebook. You will gather data and information throughout this activity that will help you. Do not answer this question now- but keep it in mind as you go through the rest of this notebook.*

**What could you do to decrease the number of mosquitoes around your house, your neighborhood and/or your school?**

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Back to the image at the beginning of this notebook...

The organisms hanging upside down in the water are also mosquitoes!

Mosquitoes go through three different steps or stages in their life cycle before they become the adult mosquito that you recognize.

The mosquito life cycle stage shown in the picture is called the larval stage. The organism is called a **larva** (larvae is the plural form of the word). The larval stage lasts several days. During this time the larvae must eat and breathe. They eat vegetation growing in the water. They breathe through a small tube that sticks out of the water.

Go to the picture on page one and find a breathing tube that is sticking out of the water. Label it.

## 2. Meet Your Neighbors “face to face”!

Your teacher will give you a jar containing mosquito larvae. Observe the larvae through the jar- do not remove the lid.

Use the space below to draw a picture of one of the larva:

Carefully observe characteristics of the larvae- such things as color, shape, parts, movement, similarities and differences. Write down at least five of those observations below:

Observations written on these lines will vary. They are based on the ideas and perceptions of each student. Check for relevancy.

1. The color of the mosquito larva is \_\_\_\_\_.

2. The shape of the mosquito larva reminds me of \_\_\_\_\_  
\_\_\_\_\_.

3. I can see parts that look like \_\_\_\_\_  
\_\_\_\_\_.

4. I would describe the movement as \_\_\_\_\_  
\_\_\_\_\_.

5. One way they look alike is \_\_\_\_\_.

6. One way they look different \_\_\_\_\_.

You will observe that same jar of mosquito larvae several times over the next few weeks. For each observation, fill in one row of this table:

Date of Observation	# of days since last observation	Observation
July 10		Many larvae. Some are moving, some are not. They wiggle around in the water. With the magnifying lens I can see a few breathing tubes.
July 13	3	A few of the larvae have changed into pupae. The pupae have a fatter body with a bigger head. They also wiggle, but not as much.

What differences did you notice in the mosquitoes over time?

The larvae changed into another form- they became pupae. They did not all change at once- there were still larvae in with some pupae. At the end, some of the pupae had become adult mosquitoes.

You will store this jar in the classroom for several days. Put your initials (or the initials of one group member) on the jar. Your teacher will tell you where to store it- it must be in a safe, warm place.

### 3. Meet The First Two Stages in the Life of a Mosquito.

As with many organisms, the **first stage** of the life cycle of a mosquito begins when a female lays an **egg**.

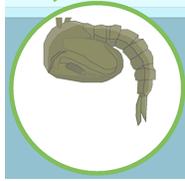
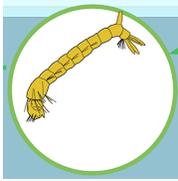
Based on your work so far, where in the environment do you think she lays them? **in the water**

Why do you think that?

**We saw the picture- and our jar- with the larvae in the water- so the egg must have been laid in the water. Does not seem possible for the egg or the larvae to move from the land to the water.**

The eggs hatch into larvae- the **second stage**. You have already seen that stage in the first picture in this notebook and in the jar.

After spending time (a few days) as larvae, they turn into the **third stage**- the pupa (pupae is the plural form of the word).



On the left is a drawing of a larva (the second stage); on the right is a drawing of a pupa (the third stage).

List two ways that the larva and pupa look alike:	List two ways that the larva and pupa look different:
1.	1.
2.	2.

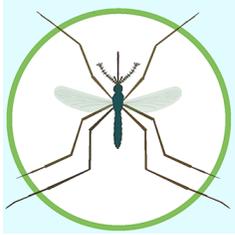
Pupae also live in the water. During this stage they form the body parts that will allow them to survive in the air as an adult. They do not eat during this time.

How can they survive?

Extension- There are other insects that go through stages of a life cycle. Can you name one? (Hint: they have colorful wings) \_\_\_\_\_

## 4. Meet an Adult Mosquito

Here is the fourth and final stage of the mosquito life cycle:



Label the following parts on the image of the adult mosquito above: wings, antennae, mouth, legs, head, thorax (section behind the head), abdomen (section behind the thorax).

How many wings does a mosquito have? \_\_\_\_\_

How many antennae does a mosquito have? \_\_\_\_\_

How many legs does a mosquito have? \_\_\_\_\_ (it is an insect!!)

The adult mosquito must eat. What do you think they eat?

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You might have said that all mosquitoes eat blood, but that is not true. Only some mosquitos will bite an animal to get blood. They need the blood because it is important to the development of eggs. So, which mosquito eats blood? \_\_\_\_\_

All mosquitoes- both boys and girls- eat nectar (plant juice).

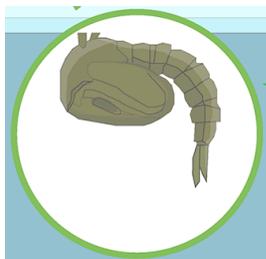
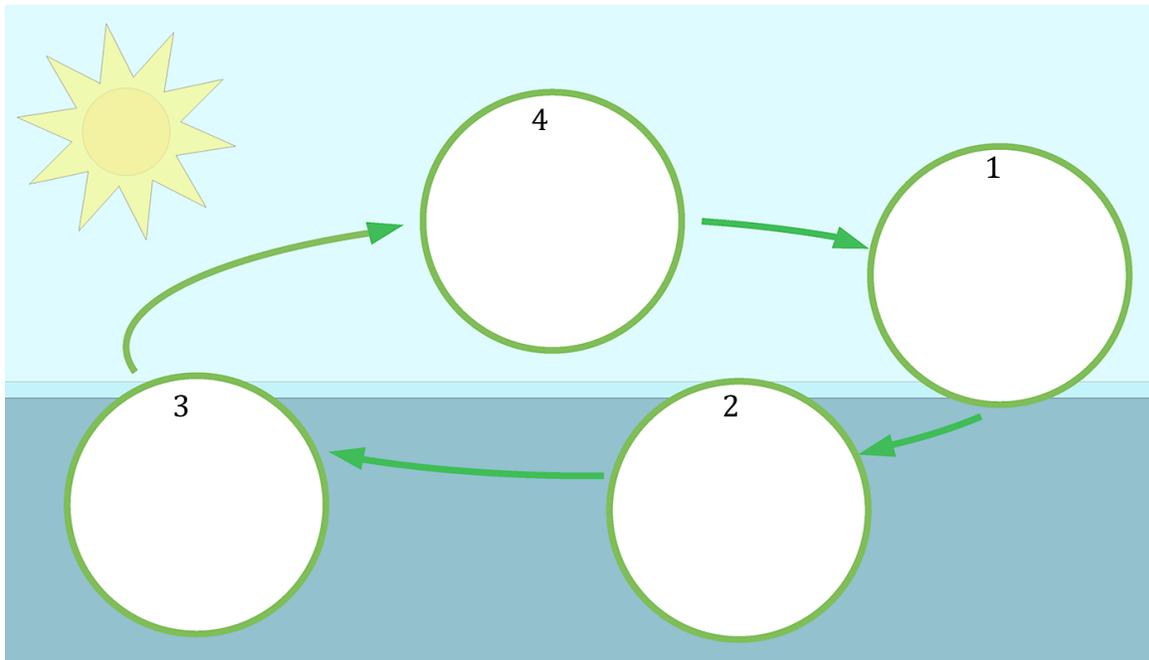
Can you name any other insects eat nectar? \_\_\_\_\_



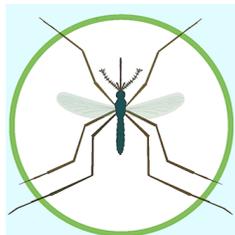
## 5. Putting the Life Cycle Together

The diagram below represents the mosquito life cycle- with the arrows showing the sequence of stages and the empty circles represent the actual stages. The four circles below the diagram show what the mosquito looks like in each of the four stages.

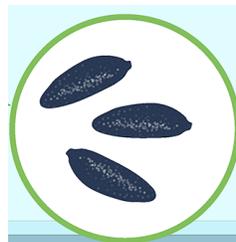
Draw a line from the circles at the bottom (with the images of the mosquito) to the circle on the diagram in which you would find that stage of the mosquito.



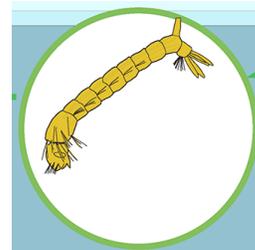
(pupa)



(adult)



(eggs)



(Larva)

## 6. Understanding the Mosquitoes' Environment

Based on what you have learned about the life cycle of a mosquito, would you expect to find mosquito eggs (or larvae or pupae) in the following places?

Place or item	Expect to find mosquito eggs/larvae/pupae?	Why or why not?
	Eggs/larvae/pupae	Mosquitoes breed in water
	none	Mosquitoes do not breed in fast running water
	Eggs/larvae/pupae	Old tires are very common breeding sites. They mosquito mothers like the dark containers because they perceive them as safe
	none	Mosquitoes do not breed in running water
	Eggs/larvae/ pupae	Some mosquitoes prefer natural tree holes and trapped water in plants as breeding sites
	Eggs/larvae/pupae	The dark, damp area under a sink which has a puddle is a perfect breeding site for mosquitoes
	adults	When adult females aren't feeding on a blood meal, they often rest and hide on walls.

## 7. Braving the Mosquitoes' Environment.

See if you can find some mosquito breeding sites around your school. These are places where you will find mosquito eggs, larvae and/or pupae.

Take the empty jar supplied by your teacher, a pen/pencil and this notebook...and go on a mosquito larvae hunt. Find an area of your own that has water.

1. Why did you choose this site?
  
  
  
  
  
  
  
  
  
  
2. Describe the site. (Where is it? Is it sunny or shady? Is it paved or is it mostly rocks or mostly dirt? What is around or near this site- any buildings, any flowers, any woods?)

Scoop up a water sample in your jar. Take the water sample back to the classroom to check it for mosquito larvae or pupae.

1. Back in the classroom, carefully observe the contents of your jar. Did your water from the site contain any mosquito larvae or pupae? \_\_\_\_\_
  
  
  
  
  
  
  
  
  
  
2. If you saw mosquitoes in your jar, why do you think they were there?
  
  
  
  
  
  
  
  
  
  
3. If you did not see any mosquitoes in your jar- why do you think the water did not contain any mosquitoes?

## Return to the Big question

What could you do to decrease the number of mosquitoes around your house, your neighborhood and/or your school? Use information you learned from this mosquito notebook.

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## 8.

### 9. Going further with your mosquito research....

Mosquitoes carry viruses and parasites. Some of those viruses and parasites cause diseases in humans. How do you think that the virus/parasite is spread from the mosquito to the human?

Some of the human diseases caused by the viruses and parasites carried by mosquitoes include Zika, Malaria, Dengue Fever, and Yellow Fever.

Research one of these diseases.

- What mosquito carries it/transmits it?
- What are the symptoms of the disease?
- What can be done to cure the disease?
- What can be done to prevent the disease?
- How common is the disease, how many people die from the disease yearly?
- Does the disease affect members of your community- or citizens of your country?

Write a paper, make a poster or do a presentation to the class to share what you learned.

We tend to think of mosquitoes as bad- either annoying (buzzing around), hurtful (biting and causing itching) or life-threatening (spreading a disease). What is their job in the area around your school? What are some good things mosquitos help with?

### **Congratulations!!**

You just did what all scientists do: you had some questions, you did some research and you found an answer!

You are now ready to begin your work as a citizen scientist mosquito researcher. Your teacher will now work with you on using the GLOBE Mosquito Habitat Mapper. Good luck with your science work!