

CITIZEN SCIENCE

A GLOBE EDUCATIONAL GUIDE

Written By: Nikki Grant-Hoffman, PhD Graphics By: Sydney D. Gordon

Acknowledgements

This guide was developed with grant support from the GLOBE Plus Post Program, YLACES (Youth Learning as Citizen Environmental Scientists, <u>www.ylaces.org</u>), and in collaboration with the Institute for Global Environmental Strategies (<u>www.strategies.org</u>), as part of award NNX16AE28A from the NASA Science Activation (SciAct) Program to IGES for the NASA Earth Science Education Collaborative project. NASA SciAct connects diverse learners of all ages with science in ways that activate minds and promote a deeper understanding of our world and beyond (<u>science.nasa.gov/learn/</u>).

We also acknowledge Escuela de Boquerón Abajo in Panamá, Escuela Líder Bribrí in Costa Rica, and Liceo Rural de Yorkín in Costa Rica, who cooperated in testing the resources with classroom students. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the funders.









Youth Learning As Citizen Environmental Scientists

Table of Contents

| Introduction | 4 |
|--|----|
| Level 1-3 | 6 |
| Learn About Mosquitoes and their Habitat | 6 |
| Learn About Technology and Citizen Science | 8 |
| Contribute to Mosquito Habitat Map | 12 |
| Level 4-6 | 13 |
| Learn About Mosquitoes and their Habitat | 13 |
| Learn About Technology and Citizen Science | 15 |
| Contribute to Mosquito Habitat Map | 20 |
| Level 7-9 | |
| Learn About Mosquitoes and their Habitat | 21 |
| Learn About Technology and Citizen Science | 24 |
| Contribute to Mosquito Habitat Map | 29 |
| Level 10-11 (12) | |
| Learn About Mosquitoes and their Habitat | 36 |
| Learn About Technology and Citizen Science | |
| Contribute to Mosquito Habitat Map | 45 |
| Links | |
| Materials in Appendix | |

Introduction

Environmental education can improve education outcomes and empower students (van de Wetering et al 2022). Citizen science, when participants contribute time, effort, knowledge, or experience to scientific investigations, can empower and give individuals a feeling of connection with other participants. Environmental education and citizen science together can improve knowledge about scientific and environmental issues. For example, after a citizen science project, participants had more correct answers



on a test about facts relevant to the project (Jordan et al 2011). Students participating in these types of activities can change intentions and behaviors (van de Wetering et al. 2022; Jordan et al 2011), which can translate into environmental action.

A review of published reports on environmental education programs demonstrated an increase in measurable desirable environmental outcomes (98% of reports), with no negative outcomes, and with 2% with no changes detected (Adrion 2020). While there may be some publication bias with authors more likely to report success than failure, these results demonstrate that environmental education can produce positive, measurable environmental outcomes. Further participatory and collaborative processes in environmental education programs (such as citizen science projects) report direct impacts on the improvement of environmental conditions (Adrion et al 2020).

In addition to educational outcomes, environmental education can have positive impacts on the mental health of young people. For example, some young people may have 'ecological anxiety' about climate change and environmental crises, but participation in activism and a sense of purpose can lead to positive management of emotions (Leger-Goodes et al 2022).

Using citizen science projects to meet academic requirements can begin a cycle of change in attitudes and behaviors (Toomey and Dumrose 2013), where students can understand sustainable development and their actions can support sustainable development. This type of science is essential for some projects and problems that

are large. You can use the power of all people to work together to find information and solutions to big problems. Students who participate may feel they can help and do something that is beneficial to the earth and to people.

The activities in this guide are suggestions, any activity can be used. Many of the materials come from NASA's (National Aeronautics and Space Administration) GLOBE (Global Learning and Observations to Benefit the Environment) program and are free to use for educational purposes. A link should be provided if changes are made to the GLOBE program documents. There are links to the documents in the guide and at the end of the document. Please refer to the original documents for more information.

There are other materials that can be used, this guide can serve as an introduction to using the GLOBE program in your classroom.

Bibliography

Adroin NM, AW Bowers, E Gaillard (2020) Environmental education outcomes for conservation: A systematic review. Biological conservation 241: 1-13

Jordan RC, SA Gray, DV Howe, WR Brooks, JG Ehrenfeld (2011) Knowledge gain and behavioral change in citizen-science programs. Conservation Biology 25: 1148-1154

Léger-Goodes T, C Malboeuf-Hurtubise, T Mastine, L Généreux, P-O Paradis, C Camden (2022) Eco-anxiety in children: A scoping review of the mental health impacts of the awareness of climate change. Frontiers in Psychology 21pgs.

Toomey AH, MC Dumrose (2013) Can citizen science lead to positive conservation attitudes and behaviors? Research in Human Ecology 20: 50-62



Learn About Mosquitoes and Their Habitat Classroom Activity

Look for Mosquitoes

Learn about the life cycle of mosquitoes and why they important to people. Use the GLOBE app to collect data about potential mosquito habitat.

Information for teachers:

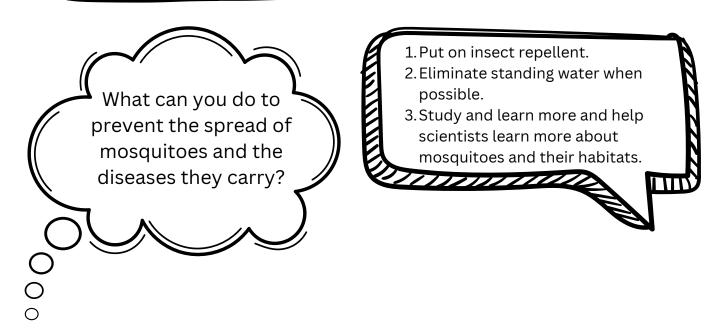
- Mission mosquito: Larvae hunters guide
- Beyond the Bite: GLOBE mission mosquito disease guide
- <u>Resources Mission Mosquito GLOBE.gov</u>
- 1. Read the <u>ZIKA ZINE</u>. The teacher can read the bulletin to the students.
- 2. Discuss as a class.
 - a. Questions: Do you like mosquitoes? Why or why not? What are your experiences with mosquitoes?
 - i. Each student writes or mentions 3 things they know or think about mosquitoes. They can discuss in small groups or pairs and then with the whole class.
 - ii. Examples: Mosquitoes can bite people. Mosquito bites can transmit diseases, for example dengue, zika, chikungunya to humans.
 - iii. Do you know that: There are more than 3,500 species of mosquitoes and ~200 of them bite. Adult mosquitoes eat nectar and are often pollinators. Adult females need blood for their eggs.
- 3. In what forms can you find mosquitoes?
 - a. Eggs, larvae, pupae, adults
 - b. Life cycle Figure 1 Mosquito life cycle Beyond the bite
 - c. Activity 6 Identify the stages of the life cycle of a mosquito <u>Mission</u> <u>Mosquito Larvae Hunters Guide</u>

Level 1-3

Learn About Mosquitoes and Their Habitat Classroom Activity

<u>4.Where do mosquitoes live? What are their habitats?</u> <u>a. Use the cards to play 'Mosquito Habitats and Hideouts' and find mosquito.</u> <u>habitats (standing water).</u>

Discussion

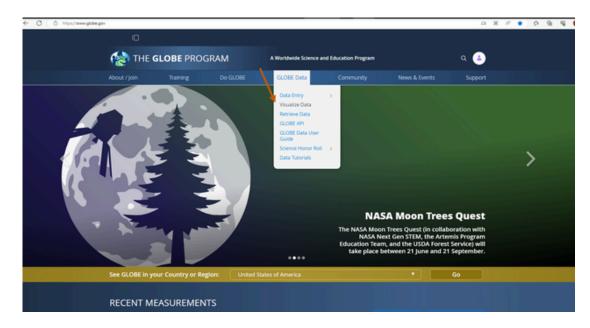




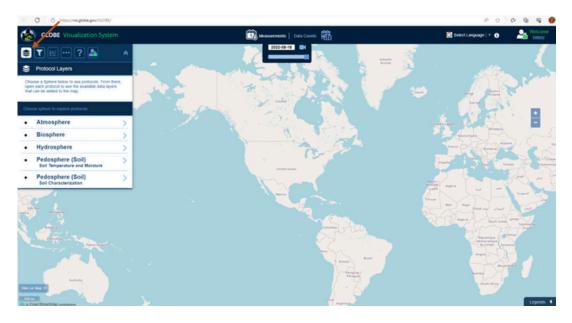


Map scavenger hunt!

Use a computer to go to the *GLOBE website (https://www.globe.gov/)*, open 'GLOBE data', and go to **'Visualize data'**

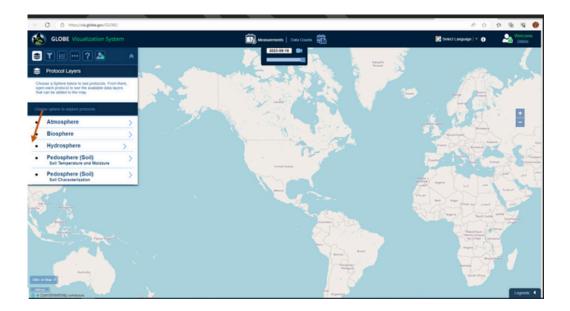


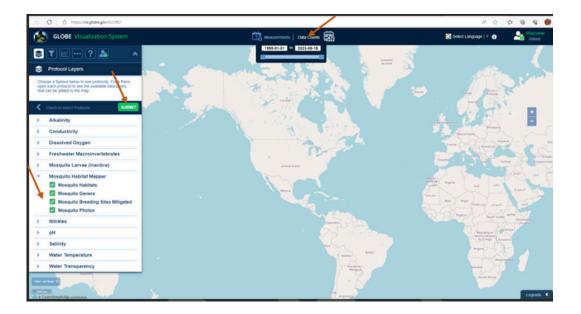
In the **'Visualization system'**, click on **'Enter the visualization system'** and click on the map layers.





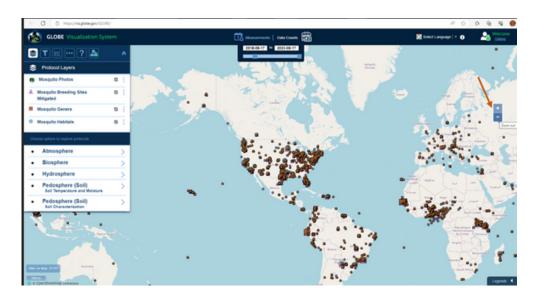
Click on '**Hydrosphere**', and expand the '**Mosquito Habitat Mapper**' layer, click on all the data layers. Choose 'Data Counts' at the top of the page and click '**SUBMIT**'.







Now you should see some points on the map, these are data. Explore the data, you can **use the plus and minus on the right side of the page to zoom,** and you can use the mouse to move the map.



Use zoom and the mouse to find your country.

| ← → O (@ mps//wagebegee | 106/ | 日 死 卒 令 命 命 |
|---|---|--|
| GLOBE Visualization Syst | m 🛗 Messarements Itala Courts 🛱 | 🔄 Seket Language 🐑 🕢 🔒 🔐 Welcom |
| 🖻 🍸 🖻 🚥 ? 🎴 | A 2018-06-17 10 2023-06-17 | |
| Se Protocol Layers | | |
| Mosquito Photos | S : Crowing Mar Nouropa | |
| Mosquito Breeding Sites Mitigated | E : Verges august and a start | |
| Mosquito Genera | | • |
| Mosquito Habitats | | Land Land Land Land Land Land Land Land |
| theose sphere to explore protocols | | number Streets |
| Atmosphere | > And | |
| Biosphere | > Contractor access fragment contractor for the second | and the second second second |
| Hydrosphere | > territor | Maderia Sensitiva |
| Pedosphere (Soil) Soil Temperature and Moisture | | and the second second second second |
| Pedosphere (Soil) Soil Characterization | > Contract Contract (in State | A dealer and the second s |
| ér: or Mig. 25112 | | Alter of the second sec |

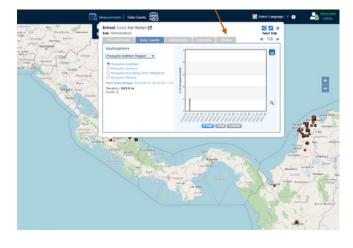
...Scavenger Hunt! (Click on the dots, you can explore the tabs and pages)

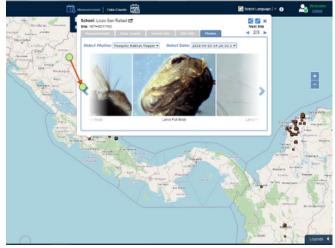
Level 1-3

Learn About Technology and Citizen Science Introduction of GLOBE

Scavenger Hunt!

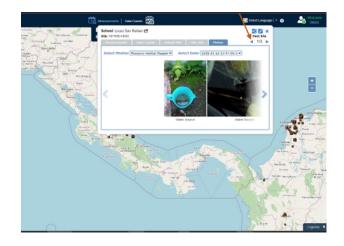
Click on the dots to explore the data. In small groups or as a class search the data. Click tabs and page arrows to explore.

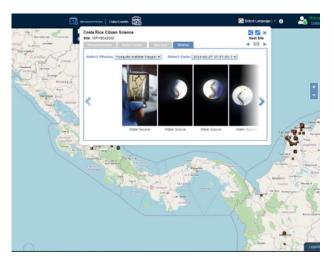




Can you find a photo of a mosquito? Try to identify what you can see in the photos (there are photos of larvae, water (habitat)), and enlarged photos of larvae and pupae.

All these data were collected by citizen scientists. Do you want to try?





Explore the data. Look in other parts of the world. What do you think you can learn from this data? What can scientists learn from this data? Discuss with your group or class.

What is citizen science? - Citizen science is the voluntary contribution of time, effort, knowledge, or experience to scientific research

Level 1-3

Contribute to Mosquito Habitat Map as a Citizen Scientist

Outdoor or Fieldtrip Activities

 Use the guide - <u>Let's build a mosquito larvae trap</u> (slide 38 and 39 in the <u>Larvae</u> <u>Hunters Guide</u>) – to build a trap, you can leave the trap outside for a few days before this activity.



Note to teachers, if you don't have larvae in your trap after a week, you can use a black or dark colored bucket with a piece of wood in the water and the air (as a ramp so the female mosquitoes can stand on the ramp and lay their eggs in the water). Leave it open with grass in the water. Make sure you don't leave it for more than 5 days so you can ensure there are no adult mosquitoes.

- 1. Go outside (of the school or on a field trip) and look for mosquito habitats (remember the game <u>Mosquito Habitats and Hideouts</u>).
- 2. Go out in small groups with one adult for each group. When you find habitat, put it on the map with the GLOBE app (an adult can have the app on their phone), you can watch a <u>video</u> on how to use the app. If you don't have a phone with the app, use the <u>Habitat Survey Page</u>.
- 3. You can continue to the 'Land Cover' page in the GLOBE app, after the 'Mosquito Habitat Mapper'.
- 4. Congratulations! You have contributed to global citizen science!





Learn About Mosquitoes and Their Habitat Classroom Activity

Look for Mosquitoes

Learn about mosquitoes and why they important to people. Use the GLOBE app to collect data about potential mosquito habitat.

Information for teachers:

- Mission mosquito: Larvae hunters guide
- Beyond the Bite: GLOBE mission mosquito disease guide
- Resources Mission Mosquito GLOBE.gov
 - 1. Read the <u>ZIKA ZINE</u>.
 - 2. Discuss as a class.
 - a. Question: Do you like mosquitoes? Why or why not? What are your experiences with mosquitoes? Each student writes or mentions 3 things they know or think about mosquitoes. They can discuss in small groups or pairs and then with the whole class.
 - i. Examples: Mosquitoes can bite people. Mosquitoes can transmit diseases, for example dengue, zika, chikungunya to humans.
 - ii. Do you know that: There are more than 3,500 species of mosquitoes and ~200 of these bite. Adult mosquitoes eat nectar and are often pollinators. Adult females need blood for their eggs.
 - 3. Remember In what forms can you find mosquitoes?
 - a. Eggs, larvae, pupae, adults
 - b. Life Cycle Figure 1 Mosquito Life Cycle <u>Beyond the Bite: GLOBE Mosquito</u> <u>Mission Disease Guide</u>
 - 4. Read Proboscis Mosquito: Mechanics of a Bite
 - a. Discuss as a class. How does this adaptation work? What are other adaptations of animals or plants?

Level 4-6

Learn About Mosquitoes and Their Habitat Classroom Activity

5. Where do mosquitoes live? What are their habitats? Use the cards to play 'Mosquito Habitats and Hideouts' and find mosquito habitats (stagnant water).

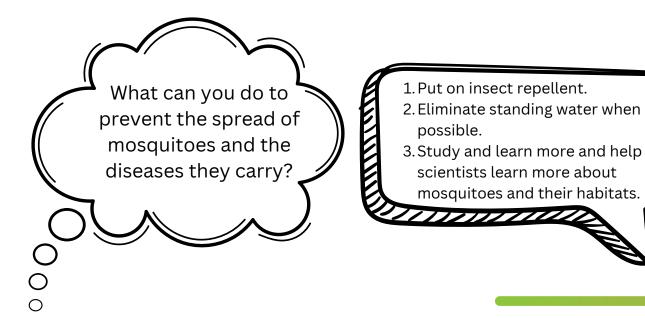
Discussion

Where can you find mosquitoes?

- Discuss the concepts of individuals, populations, communities, species, niche, and ecosystem.
- For instance, is there a population in a city, on a river?
 What is the niche of some mosquito species, are there species that prefer some habitats?
- **Example**: Aedes mosquitoes prefer containers, and Anopholes prefer puddles or other more natural habitats.

Further Discussion

Use the <u>Beyond the Bite: GLOBE Mosquito Mission</u> <u>Disease Guide</u> for more information.



Level 4-6

Learn About Technology and Citizen Science Introduction of GLOBE

- 1. You can build mosquito traps in class and see if you can trap some larvae. When you have larvae, you can look at them with magnification and count them.
- Use the guide <u>Let's build a mosquito larvae trap</u> (slide 38 and 39 in the <u>Larvae</u> <u>Hunters Guide</u>) – to build a trap, you can leave the trap outside for a few days before this magnification activity.



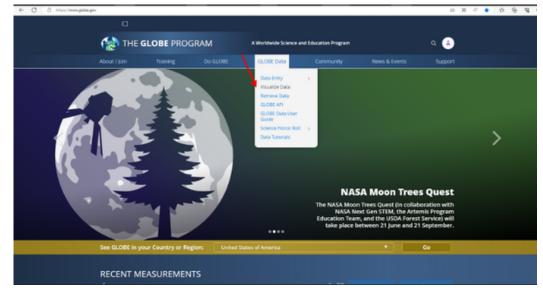
Note for teachers, if you don't have larvae in your trap after a week, you can use a black or dark colored bucket with a piece of wood between the water and the air (as a ramp so the female mosquitoes can stand on the ramp and lay their eggs in the water). Leave it open with grass in the water. Make sure you don't leave it for more than 5 days so you can ensure there are no adult mosquitoes.

1. Magnification: Magnify that

- a. Practice magnifying things, you can use a hand lens, magnifying glass, or phone magnifier and take photos.
 - i. How to use a clip-on microscope (slide 86 in the Larvae Hunters Guide)
- b. If you have mosquito larvae from your traps, you can count them and report the number in the GLOBE app (see upcoming activities).

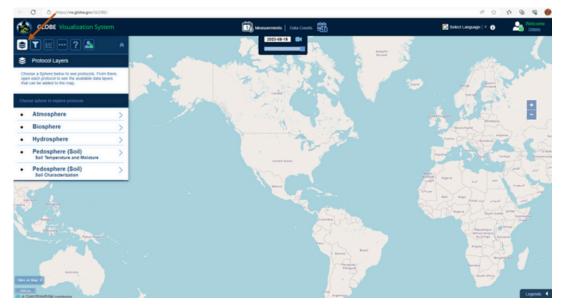
Map scavenger hunt!

Use a computer to go to the GLOBE website (https://www.globe.gov/), open 'GLOBE data', and go to 'Visualize data'

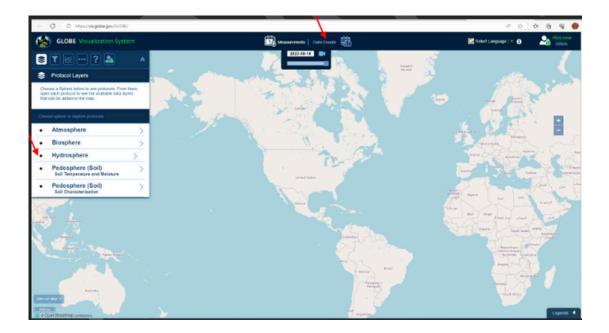




In the **'Visualization system'**, click on **'Enter the visualization system'** and click on the map layers.

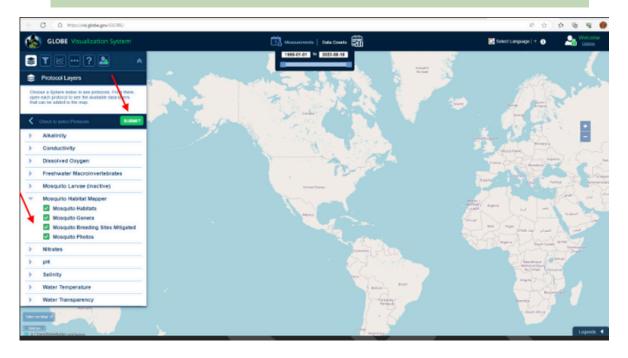


Click on 'Hydrosphere', and expand the 'Mosquito Habitat Mapper' layer, click on all the data layers. Choose 'Data Counts' at the top of the page and click 'SUBMIT'.

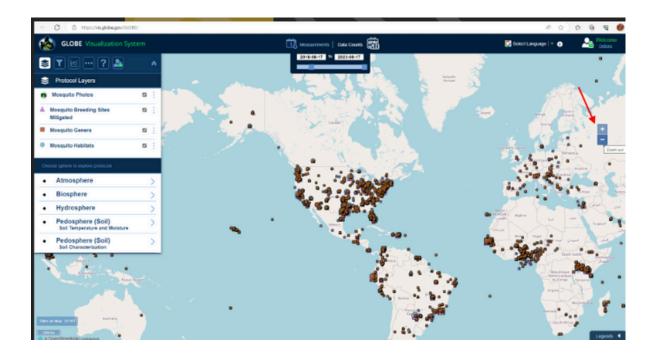


Level 4-6

Learn About Technology and Citizen Science Introduction of GLOBE

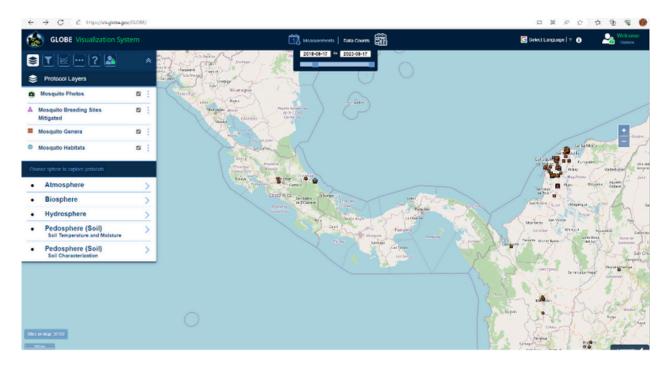


Now you should see some points on the map, these are data. Explore the data, you can use the plus and minus on the right side of the page to zoom, and you can use the mouse to move the map.



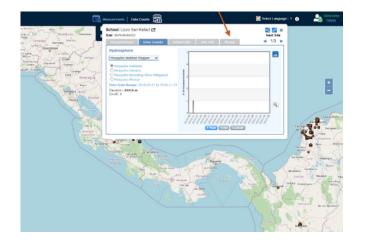


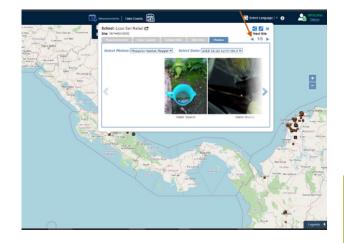
Use zoom and the mouse to find your country.



Scavenger Hunt!

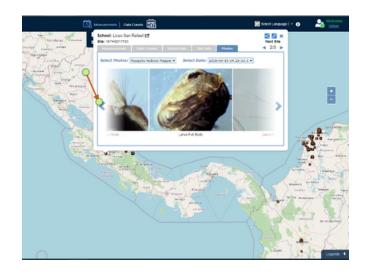
Click on the dots, you can explore the tabs and pages.

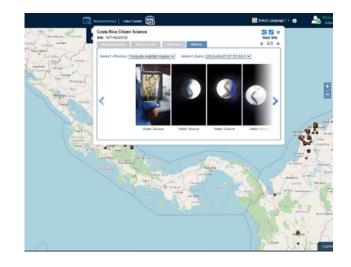




Level 4-6

Learn About Technology and Citizen Science Introduction of GLOBE





In small groups, or as a whole class, look for data: Can you find a photo of a mosquito? Try to identify what you can see in the photos (there are photos of larvae, water (habitat)), and enlarged photos of larvae and pupae. Where and when do you find mosquitoes? What does this mean about mosquito habitat? For example, in Alaska when is the data, in the winter or summer? Why? What does this mean with climate change? *Mosquitoes can move to different parts of the world if it is warmer.

Explore the data. Look in other parts of the world. What do you think you can learn from this data? What can scientists learn from this data? Discuss with your group or class.

Can you find photos of the three genera of mosquitoes (*Anopholes, Aedes, Culex*)? Can you use the <u>Mosquito Larvae Hunter: Level 1</u> to identify them?

All these data were collected by citizen scientists. Do you want to try?

What is citizen science? - Citizen science is the voluntary contribution of time, effort, knowledge, or experience to scientific research

Level 4-6

Contribute to Mosquito Habitat Map as a Citizen Scientist

Outdoor or Fieldtrip Activities

- 1. Go outside (of the school or on a field trip) and look for mosquito habitats.
- 2. Go out in small groups with one adult for each group. When you find habitat, put it on the map with the GLOBE app (an adult can have the app on their phone), you can watch a <u>video</u> on how to use the app. If you don't have a phone with the app, use the <u>Habitat Survey Page</u>.
- 3. You can continue to the 'Land Cover' page in the GLOBE app, after the 'Mosquito Habitat Mapper'.
- ...Congratulations! You have contributed to global citizen science!



- 1. If you have built a mosquito trap or if you have some water samples with larvae, continue here.
 - a. Can you count and identify some larvae?
- 2. Use the Mosquito Larvae Hunter: Level 1
 - a. Identify the eggs, larva, and pupae. Count the larvae, you can report the numbers in the GLOBE app.



Learn About Mosquitoes and Their Habitat Classroom Activity

Look for Mosquitoes

Learn about mosquitoes and why they important to people. Use the GLOBE app to collect data about potential mosquito habitat.

Information for teachers:

- <u>Mission mosquito: Larvae hunters guide</u>
- Beyond the Bite: GLOBE mission mosquito disease guide
- <u>Resources Mission Mosquito GLOBE.gov</u>
 - 1. Read the GLOBE Mosquito Mission's Beyond the Bite: Disease Guide.
 - 2. Discuss as a class.
 - a. Question: What are your experiences with mosquitoes? What are the potential solutions for disease-carrying mosquitoes? Write or mention 3 things you know or think about mosquitoes. You can discuss in small groups or pairs and then as a whole class.
 - b. Examples: Mosquitos can transmit diseases, for example dengue, zika, chikungunya to humans.
 - c. Do you know that: There are more than 3,500 species of mosquitoes and ~200 of these bite. Adult mosquitoes eat nectar and are often pollinators.
 Adult females need blood for their eggs.
 - 3. Small group research What are people doing about mosquito transmitted illnesses?



Teachers: You can search for information about *Aedes aegypti* and *Wolbachia* – *Wolbachia* is a bacteria that can be introduced into *Ae. aegypti* populations. These bacteria can slow the spread of viruses (yellow fever, dengue, chikungunya) in mosquito populations.

Learn About Mosquitoes and Their Habitat Classroom Activity



- You can also look for information on genetic modification of mosquitoes, for example in Panama.
- You can look up information about insecticides. How can the use of insecticides effect other parts of the environment? For example, water, agricultural areas?



Global opportunity for students - International Virtual Science Symposium:

The <u>International Virtual Science Symposium</u> is an opportunity for GLOBE students to showcase their research to the rest of the community. Projects are judged by prestigious scientists from dozens of GLOBE countries. Students are eligible to receive GLOBE stipends and badges.

Discussion

- 1. Remember In what forms can you find mosquitoes?
 - a. Eggs, larvae, pupae, adults
 - b. Life Cycle Figure 1 Mosquito Life Cycle <u>Beyond the Bite: GLOBE Mosquito</u> <u>Mission Disease Guide</u>
- 2. Read Proboscis Mosquito: Mechanics of a Bite
 - a. Discuss with the class. How does this adaptation work? What are other adaptations of animals or plants?
- 3. Remember: Where do mosquitoes live? What are their habitats?
 - a. Use the cards to play <u>'Mosquito Habitats and Hideouts'</u> and find the mosquito habitats (stagnant water).

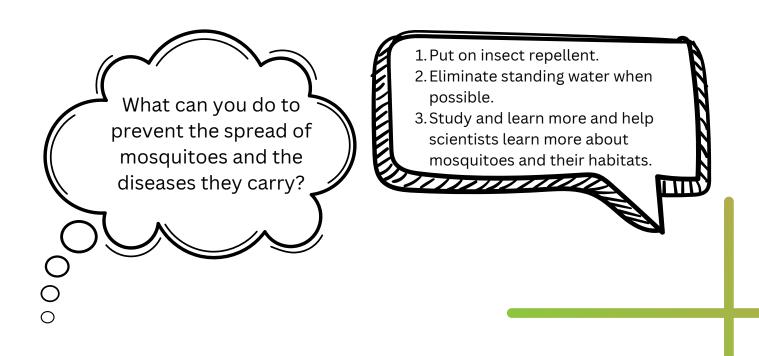
Learn About Mosquitoes and Their Habitat Classroom Activity

Where can you find mosquitoes?

- Discuss the individuals, population, community, species, niche, ecosystem.
 - For example, there is a population in a city, on a river.
- What is the niche of some mosquito species, are there species that prefer some habitats?
 - For example, Aedes mosquitoes prefer containers, and Anopholes prefer puddles or other more natural habitats

Use GLOBE's <u>Beyond the Bite: Mosquito Mission</u> <u>Disease Guide</u> for more information.

Further Discussion

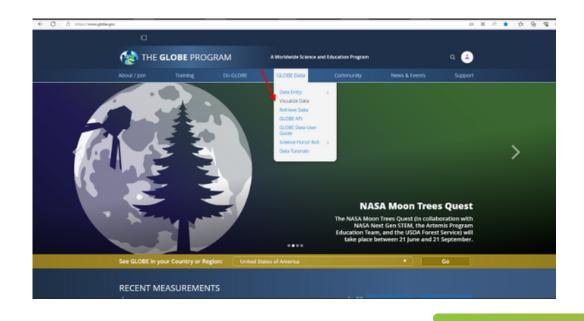


Learn About Technology and Citizen Science Introduction of GLOBE

- 1. Remember magnification: Magnify that
 - a. Practice magnifying some things, you can use a hand lens, magnifying glass, or phone magnifier and take photos.
- 2. How to use a clip-on microscope (slide 86 in the Larvae Hunters Guide)
 - a. If you have mosquito larvae in your traps, you can count them and report the number in the GLOBE app (see upcoming activities).
- 3. You can build a mosquito trap in small groups and see if you can catch some larvae.
 - a. Use the guide <u>Let's build a mosquito larvae trap</u> (slide 38 and 39 in the <u>Larvae Hunters Guide</u>) to build a trap, you can leave the trap outside for a few days.
 - b. You can build traps at school and students can also build traps at home as an extension task.
- 4. Identify eggs, larvae, and pupae. Count the larvae, you can report the numbers in the GLOBE app.
 - a. Activities: Mosquito larvae Hunters Level 2

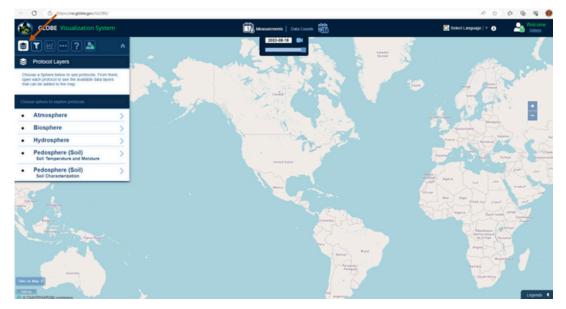
Map scavenger hunt!

Use a computer to go to the *GLOBE website (https://www.globe.gov/)*, open 'GLOBE data', and go to **'Visualize data'**

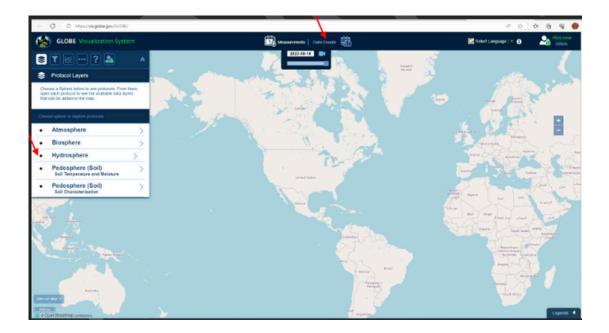




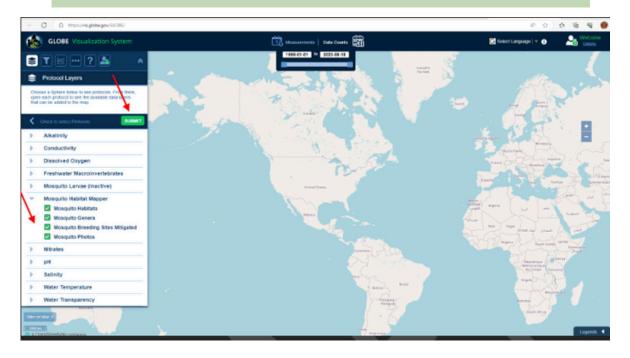
In the **'Visualization system'**, click on **'Enter the visualization system'** and click on the map layers.



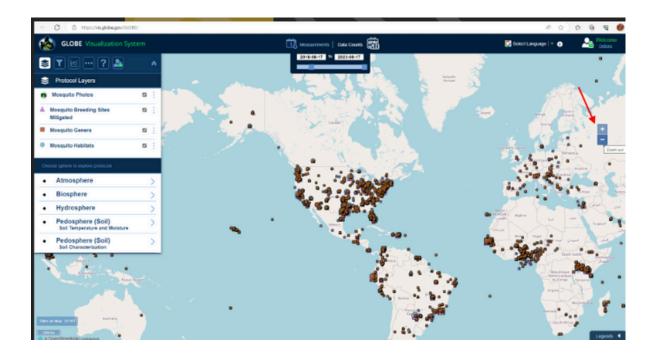
Click on **'Hydrosphere'**, and expand the **'Mosquito Habitat Mapper'** layer, click on all the data layers. Choose **'Data Counts'** at the top of the page and click **'SUBMIT'**.



Learn About Technology and Citizen Science Introduction of GLOBE

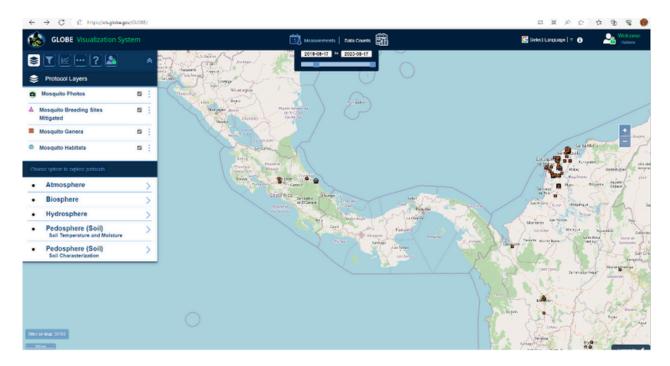


You should see some points on the map, these are data. Explore the data, you can use the plus and minus on the right side of the page to zoom, and you can use the mouse to move the map.



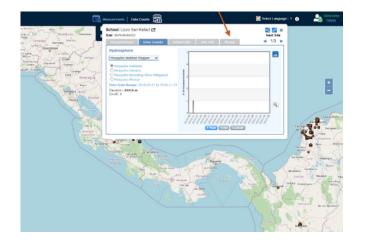


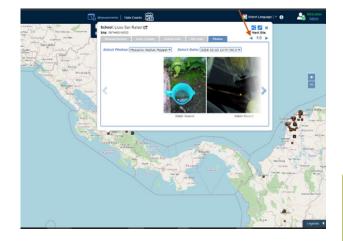
Use zoom and the mouse to find your country.



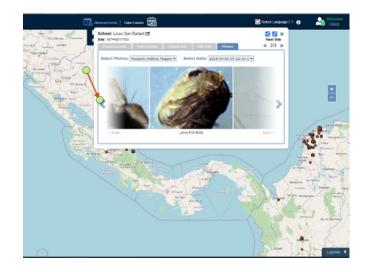
Scavenger Hunt!

Click on the dots, you can explore the tabs and pages.

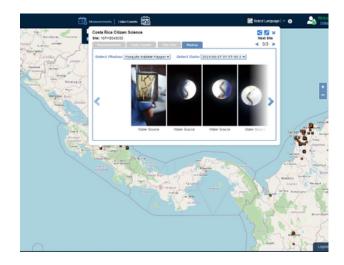




Learn About Technology and Citizen Science Introduction of GLOBE



In small groups, or with the class, search for data. Use the <u>Beyond the Bite: GLOBE Mosquito Mission Disease Guide</u> Can you find the three genera of mosquitoes that transmit the diseases (*Anopholes, Aedes, Culex*)? Where and when can they be found?



What does this mean about disease transmission? For example, can you find dengue fever in Africa? Why or why not? Use the table in <u>Beyond the Bite: GLOBE's Mosquito Mission Disease</u> <u>Guide</u> to help explore the data and see how it can support the information people have about these diseases.

Explore the data. Look in other parts of the world. What do you think you can learn from this data? What can scientists learn from this data? Discuss with your group or class.

All these data were collected by citizen scientists. Do you want to try?

What is citizen science? - Citizen science is the voluntary contribution of time, effort, knowledge, or experience to scientific research

Contribute to Mosquito Habitat Map as a Citizen Scientist

Outside Activities

- 1. Go outside (of the school or on a field trip) and look for mosquito habitats.
- 2. Go out in small groups. When you find habitat, put it on the map with the GLOBE app, you can watch a <u>video</u> on how to use the app. If you don't have a phone with the app, use the <u>Habitat Survey Page</u>.
- 3. You can continue to the 'Land Cover' page in the GLOBE app, after the 'Mosquito Habitat Mapper'.
- ...Congratulations! You have contributed to global citizen science!





If you have built a mosquito trap or if you have a water sample with larvae, continue here.

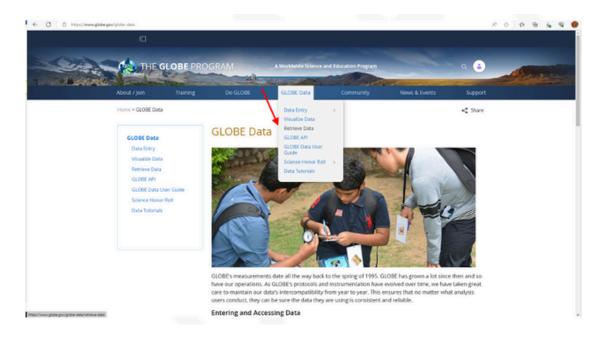
- 1. Can you count and identify some larvae?
 - a. Use the Larvae Hunters Level 2
 - b. Identify the eggs, larvae, and pupae.
 - c. Count the larvae, you can report the numbers in the GLOBE app.
- 2. If you find larvae, you can collect data on the larvae.
 - a. You can put your data into the GLOBE app or the <u>Habitat Survey Page</u>, and then into the GLOBE app.

Contribute to Mosquito Habitat Map as a Citizen Scientist

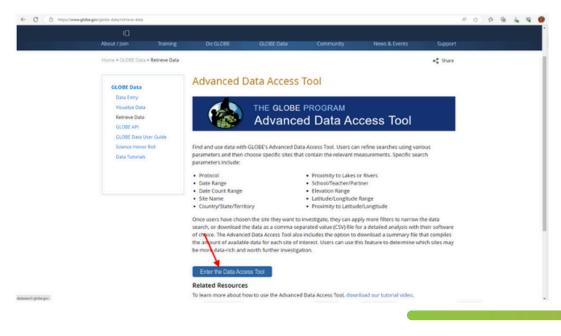
Outside Activities

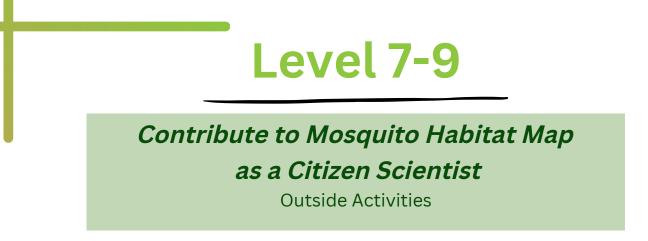
Find Data

Use a computer to go to the GLOBE website (https://www.globe.gov/), open 'GLOBE data', and go to 'Retrieve data'.



Go to 'Enter the data access tool' and click.

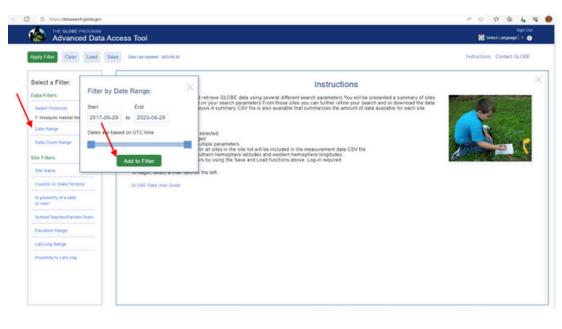




Go to 'Select protocol', click and choose 'Mosquito Habitat Mapper', click 'Add to Filter'.

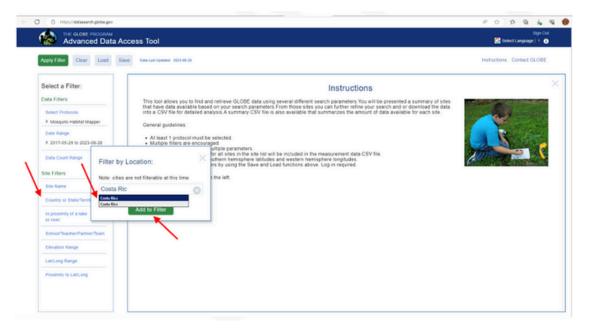
| Apply Filter Clear | | × | Instructions Contact GLOBE |
|--|---|--|----------------------------|
| Select a Filter: Data Filters Select Pastocils Date Range Data Court Range Ster Filters Ster Filters Ster Filters Ster Name County of State/Field In postmy of State/Field | Hydrosphere Adalinity Orsiolved Oxygen Mospulo Lavae (inactive) Mospulo Lavae (inactive) Mospulo Habate Masper Notates H Salinity Were Temperature Were Temperature Were Temperature Moster Temperature Moster Temperature Moster Temperature | Instructions watch parameters You will be presented a summary of sites you can faither referin you search and or download the data summarizes the amount of data available for each site. | |
| Elevation Range | | | |
| LatiLong Range | | | |
| Preximity to Latitiong | | | |

Add a range of data, probably all the data that is available. Click 'Add to Filter'.



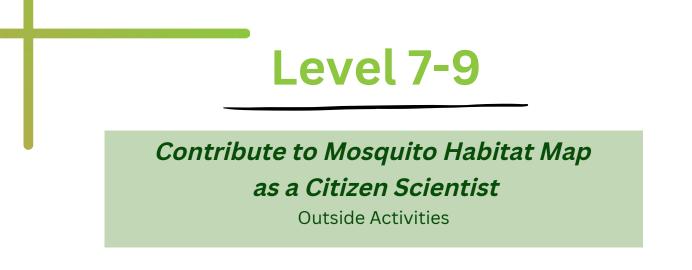


Add a country. Enter a country and click 'Add to Filter'.



Click on 'Apply Filter' and then on 'Obtain Measurement Data'.

| Advanced Da | ta Acc | ess Tool | | | | Sign (Select Language * |
|-------------------------------------|----------|------------------------------|---|----------------------------|---------------------|-------------------------------|
| Apply Filter Clear Load | Savo | Data Last Updated 2023-08-28 | | | | Instructions Contact GLOB |
| Select a Filter: | 1.000 | Sites Found | vi are for the entire martit(s) selected. Sed. download the CSV Na to clicing the Cetter Neuropenert | Contractory of Contractory | | |
| Data Filters | | tain Measurement Data | Download Summary Data | Cara Incon | | |
| Select Protocols | | | | | | |
| X Mosquito Habitat Mapper | 8 | School Name | Site Name | Lattude | Longitude Elevation | |
| | φ. | Costa Rica Otgan Science | 179404429180 | 31.08742 | -83.34591 14.9 | |
| Date Range | 2 | Cesta Rica Otgan Science | 129406041146 | 31.07464 | -83.33488 14.4 | |
| * | 8 | Costa Rica Otzen Science | 1790640147 | 33.07575 | -83.33087 12.8 | |
| × 2017-05-29 to 2023-08-28 | ¥. | Costa Rica Otzen Science | 179404740007 | 5.99622 | 43.04043 63.3 | |
| | 2 | Costa Rica Citizen Science | 179606752045 | | -83.05067 6.3 | |
| Data Court Range | 2 | Cista Rica Otgan Science | 129404754002 | | -83.0488 4.5 | |
| | 9 | Casta Rica Otgan Science | 179404754038 | 6.67912 | -83.04081 5 | |
| and the second | μ. | Costa Rica Ottaen Science | 1794047400038 | 5.90723 | -83.04043 02.7 | |
| Site Filters | μ. | Cesta Rica Otizen Science | 129404760056 | 5.99542 | -83.04044 59.2 | |
| | 2 | Cista Rica Citaen Science | 36P+6040013 | | -84.33471 843.1 | |
| Site Name | 14 C | Liceo San Rufael | 36PH6040832 | 5.90244 | -84.22472 843.3 | |
| | | Liceo San Rufael | 20PH004H032 | | -04.22381 044.9 | |
| Country or State/Territory | R. | Liceo San Rafael | 26PH5045K33 | | -84,22289 846.7 | |
| | 2 | Liceo San Rufael | 36PH60401036 | | -84.3256 836 | |
| × Costa Rica | R. | Liteo San Rufael | 06Pw60127u35 | | -84,34748 1121.3 | |
| | ¥. | Liceo San Rufael | 179404728007 | 5.99612 | -83.04436 01.4 | |
| Is preximity of a take or river: | | | | | | |
| School/Teacher/Partner/Team | | | | | | |
| Elevation Range | | | | | | |
| Lati/Long Range | | | | | | |
| Pressnely to Latitiong | | | | | | |



It may take a few minutes, especially if there is a lot of data. When you finish, click 'Download'. You can open or save the data.

| Advanced Data | Access Tool | | | | | | | 🛃 Select Language | • 0 |
|------------------------------|-----------------------------------|---|------------------------|--------------------|----------|-----------|---------|-------------------------|-----|
| Apply Filter Clear Load | Savo Oversets | dated 2023-38-28 | | | | | | Instructions Contact GL | 086 |
| Select a Filter: | 16 Sites I | ros the results shown are for the | erden merthäl seinchei | 6 | | | | | |
| Data Filters | | Cortra later seached douvroe arrement Data (~34) | Download Sum | | sultan. | | | | |
| Select Protocols | D School Name | | Statione | | Later | Longtude | Textus. | | |
| W DESIGN OF LOOP AND DESIGN. | Coda Rea Ca | ten Griania | 179406424350 | | | -41.3459 | | | |
| × Mosquito Habitat Mapper | P Costs Ros Ce | | 170406413-65 | 1 | | -83.33488 | | | |
| | Certa Noa Cit | | 179408942147 | 1 | | 43.33297 | | | |
| Date Range | P CHID ROLO | | 179404790057 | | | 43.04040 | | | |
| × 2017-05-29 to 2023-06-28 | P. Costa Rea Ca | | 13900732042 | - | | | | | |
| × 2011/00-2310 2020-00-28 | P Costa Rea Ce | | 170406754027 | Bank by Doublest | | | 4.5 | | |
| | Centa Rica Cit | | 179404734038 | Ready for Download | | | 5 | | |
| Data Court Range | Celta Rea Cit | | 179404760056 | | 7.997.23 | 10.000 | 42.7 | | |
| | Costa Roa Ce | pen Science | 1.79404790056 | | | -83.04044 | | | |
| Site Filters | Costs Rea CR | | 14846340000 | | | -84.23471 | | | |
| Sille Filters | Loss San Raf | el | 14946140032 | | | -04.22472 | | | |
| | Lices San Ruf | el | 189+63+4132 | | 9.96844 | -04.22380 | 844.3 | | |
| Site Name | Lose San Ruf. | ed . | 16946045033 | | 9.96133 | -04.21288 | 846.7 | | |
| | Lices San Rul | el la | 1679-6340135 | | 9.97207 | -84.2256 | 426 | | |
| Country or State/Territory | R Loss San Raf | el | 14946817135 | | 16.87976 | -04.24748 | 1091.3 | | |
| × Costa Rica | Con San Raf | el . | 139404794057 | | 9.99632 | 43,3408 | 81.4 | | |
| is preximity of a take | | | | | | | | | |
| or river. | | | | | | | | | |
| SchoovTeacher/Partner/Team | | | | | | | | | |
| Elevation Range | | | | | | | | | |
| Latitiong Range | | | | | | | | | |
| | | | | | | | | | |

Explore data.

- a. In small groups explore the data. What can you learn from the data? For example:
 - i. What is the most common life stage to find mosquitoes? (larvae, pupae, adults). Search in P-Q columns.
 - ii. What are the most common genera, the most common species found in the selected area? (U-V columns)
 - iii. What else can you learn about the data? Work in small groups and then present to the class.
 - iv. Which data is the most useful, and which is not useful? Why?
 - 1. You can also 'clean the data', for example you can delete data you don't want to use or change the titles (in the first two rows).

Contribute to Mosquito Habitat Map as a Citizen Scientist

Outside Activities

Note: The first latitude and longitude data (columns E-F) are not very accurate, the values in columns AC-AB are more accurate, you should use these if you want to use latitude and longitude.

I

| Apply Filter Clear Load | _ | Data Last 1204045, 2022-48-20 | | | | Cipen Cipen See more | t te do with 01.000Mean Save as | v | |
|-------------------------------------|------------|--|---|-------------|------------------|----------------------------|------------------------------------|---|--|
| Select a Filter: | When 8 | Sites Found here to determine the result share are form | e antre monthos belanded ad the City the Is closing the Ostain Measurement | Data dullar | | | | | |
| Data Filters | | enicod Measurement Data (~34) | Download Summary Data | | | | | | |
| Select Protocols | | School Name | Sta Rame | Lebula | Larghda Dentan | | | | |
| X Mosquito Habitat Mapper | | Costa Rica Otzen Science | 179404429100 | | 43.34981 34.9 | | | | |
| | | Costa Bica Otave Science | 17980440146 | | 43.33400 34.4 | | | | |
| | | Costa Rica Otzen Science | 17909402147 | 10.87575 | -83.30397 12.8 | | | | |
| Date Range | | Costa Rica Otgan Science | 17949/760017 | 9.99622 | -81.046 61.1 | | | | |
| X 2017-05-29 to 2020-08-28 | | Conta Riva Otzen Science | 17969/752145 | 3.08344 | 43.15067 6.3 | | | | |
| ~ 2011-00-2310 2022-00-23 | | Corta Rica Otgan Science | 17949/754127 | 9.07822 | 41.0488 4.5 | | | | |
| | | Costa Rica Otaen Science | 1799/05408 | 9.97912 | 43.04081.5 | | | | |
| Data Count Range | w | Costa Rica Citizen Science | 17940/050058 | 8.99723 | -63.04045 62.7 | | | | |
| | 8 | Costa Rica Otaxe Science | 17940/060006 | 9.99942 | 43.04044 59.1 | | | | |
| Site Filters | 8 | Costa Rica Otzen Science | 18940040003 | 9.96K25 | -84.32471 842.3 | | | | |
| Sille Friders | R. | Lices See Rafeel | 16746040102 | 9.06046 | -84.32472 843.3 | | | | |
| Site Name | | Lices Sax Rafael | 1894004402 | 3.96844 | -84.32381 846.9 | | | | |
| site name | 2 | Lices San Rafeel | 16945045103 | 9.96102 | -84.32389 846.7 | | | | |
| | N . | Lices See Rafeel | 18990042106 | 9.97267 | -84.3256 836 | | | | |
| Country or State/Territory | R. | Lideo San Rafeel | 14946017155 | 10.87676 | -84,24748 1151,2 | | | | |
| × Costa Rica | * | Lites See Rafeel | 1746059087 | 9.99632 | -83.0H06 81.4 | | | | |
| In proximity of a take of diver. | | | | | | | | | |
| School Teacher Partner/Team | | | | | | | | | |
| | | | | | | | | | |
| Elevation Range | | | | | | | | | |

| /** ()) | X Cut | Incert Draw | - Fage Layout | | uta Review View | | obat General | - 🔳 🗊 | Normal | Bad | Good | Neutral | | 8 228 (11) | EAnten * AV O | innerts d | Share |
|------------|----------------|-------------|--------------------------|--|------------------------|---------------------------------|-----------------|---|----------------|---|--|---------------------|--------------------|----------------|---|---|-------|
| | of Format Pair | w 8.7 | ¥ - 🗄 - 🖄 - | A- == | THE IS IN Margari | k Center 🗵 | 5 - 96 9 | M 20 Conditional Format Formatting+ 3dde- | as Calculation | CheckCell | Explanatory. | input | 1 | et Delete Form | 4 € Cear+ Set & Fed | | 1 |
| | Optord | 0 | Famil | 0 | Alignment | | Runber | 0 | | Dyles | | | | Ceth | Editing | Sendarity | |
| | • 11 | X 🗸 . | 6 organisation | ed. | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| 2 | 10 | G | н | 1.1 | 1 | к | 1 | м | N | 0 | P | Q | R | s | т | U | |
| ī | | | | | | | - | | | | | - | | | | | - |
| | longitude | elevation | measured_on | mosquito habitat mapper:m osquito habitat mapper id | habitat mapper:data | mosquito habitat mapper:u | mapper: | mosquito habitat mapper:water source type | | mosquito habitat mapper:larvae count | mosquite habitat mapper: mosquite eggs | mapper: mosquito | habitat mapper: | mosquito | mosquito habitat mapper:last identify stage | mosquito habitat mapper:g enus | ha |
| | | | | | | rd in Coord | finated Un | iversal Time (UTC) | | | -00- | | | | | | |
| 3 | -84.2247 | 842.1 | 6/27/2019 | | | | | 2 container: artificial | jar | 1 | 5 FALSE | | FALSE | FALSE | identify-aedes-tuft | Aedes | |
| 4 | -83.3459 | 14.9 | 9/1/2018 | 4275 | GLOBE Observer | 4.7E+07 | 2018-09 | Container: artificial | dish or po | | 2 FALSE | | TRUE | FALSE | identify siphon-pecten | | |
| 5 | -83.3459 | 14.9 | 9/1/2018 | 4274 | GLOBE Observer | 4.7E+07 | 2018-09- | Container: artificial | dish or po | | 1 FALSE | | TRUE | FALSE | identify siphon-pecten | | |
| | -83.3459 | 14.9 | 9/1/2018 | 4276 | GLOBE Observer | 4.7E+07 | 2018-09- | Container: artificial | dish or po | | 1 FALSE | | TRUE | FALSE | identify siphon-pecten | | |
| T | -83.3459 | 14.9 | 9/1/2018 | 4277 | GLOBE Observer | 4.8E+07 | 2018-09- | Container: artificial | animal tro | ough or water be | w | | | | | | |
| đ | -83.3349 | 14.4 | 9/2/2018 | 4283 | GLOBE Observer | 4.7E+07 | 2018-09- | Cstill: lake/pond/swar | ditch | | FALSE | | TRUE | TRUE | identify-siphon-hairs | | |
| | -83.334 | 12.8 | 9/3/2018 | 4284 | GLOBE Observer | 4.7E+07 | 2018-09- | Cstill: lake/pond/swar | ditch | | FALSE | | TRUE | TRUE | identify-siphon-hairs | | |
| 0 | -83.0507 | 6.3 | 9/22/2018 | 4529 | GLOBE Observer | 4.8E+07 | 2018-09- | 2 container: artificial | flower or | plant pot/tray | | | FALSE | | identify-aedes-thorax | Aedes | in |
| 1 | -83.0507 | 6.3 | 9/22/2018 | 4530 | GLOBE Observer | 4.8E+07 | 2018-09- | 2 container: artificial | flower or | | 1 FALSE | | FALSE | FALSE | | Aedes | at |
| 5 | -83.0507 | 6.3 | 9/22/2018 | 4533 | GLOBE Observer | 4.8E+07 | 2018-09- | 2 container: artificial | discarded | 1 | 5 FALSE | | FALSE | TRUE | identify-later | | |
| 3 | -83.0488 | 4.5 | 9/23/2018 | 4548 | GLOBE Observer | 4.8E+07 | 2018-09- | 2container: artificial | flower or | plant pot/tray | FALSE | | FALSE | FALSE | identify-siphon-pecten | | |
| 6 | -83.0488 | 5 | 9/23/2018 | 4549 | GLOBE Observer | 4.8E+07 | 2018-09- | 2 container: artificial | jar | | 5 FALSE | | FALSE | FALSE | identify-basal-tuft | | |
| 5 | -83.0434 | 59.1 | 9/23/2018 | 4555 | GLOBE Observer | 4.9E+07 | 2018-09- | 2container: artificial | dish or po | (| 1 FALSE | | FALSE | FALSE | identify-saddle | | |
| 6 | -83.0434 | 59.1 | 9/23/2018 | | GLOBE Observer | 4.9E+07 | 2018-09- | 2 container: artificial | dish or po | K | 2 FALSE | | TRUE | FALSE | identify-aedes-tuft | Aedes | |
| - | -83.0434 | 63.3 | 9/22/2018 | | | | | 2container: artificial | | A | | | FALSE | | | | |
| 8 | -83.0434 | 63.3 | 9/22/2018 | | | | | 2container: artificial | | | 1 | | FALSE | | identify-verify-larva | Aedes | in |
| 61 | 92.0494 | 49.9 | 0/33/3018 mDate 19812 | | GLORE Obcasses | A 95.07 | 3019.00 | Icontoiner settleist | athor | 1.4 | EALCE | | EALCE | EALCE | Mantifu endella comb | | |

Contribute to Mosquito Habitat Map as a Citizen Scientist

Outside Activities



Global opportunity for students - International Virtual Science Symposium: The International Virtual Science Symposium is an opportunity for GLOBE students to showcase their research to the rest of the community. Projects are judged by prestigious scientists from dozens of GLOBE countries. Students are eligible to receive GLOBE stipends and badges.

Level 10-11 (12)

Learn About Mosquitoes and Their Habitat Classroom Activity

Look for Mosquitoes

Learning about mosquitoes and why they are important to people on a personal, local, and global level. Use the GLOBE app to collect data on potential mosquito habitat.

Information for teachers:

- Mission mosquito: Larvae hunters guide
- <u>Beyond the Bite: GLOBE mission mosquito disease guide</u>
- Resources Mission Mosquito GLOBE.gov
 - 1. Read the GLOBE Mosquito Mission's Beyond the Bite: Disease Guide.
 - 2. Discuss as a class.
 - a. Question: What are your experiences with mosquitoes? What are the potential solutions for disease-carrying mosquitoes? Write or mention 3 things you know or think about mosquitoes. You can discuss in small groups or pairs and then as a whole class.
 - b. Examples: Mosquitos can transmit diseases, for example dengue, zika, chikungunya to humans.
 - c. Do you know that: There are more than 3,500 species of mosquitoes and ~200 of these bite. Adult mosquitoes eat nectar and are often pollinators.
 Adult females need blood for their eggs.
 - 3. Small group research What are people doing about mosquito transmitted illnesses?



Teachers: You can search for information about *Aedes aegypti* and *Wolbachia* – *Wolbachia* is a bacteria that can be introduced into *Ae. aegypti* populations. These bacteria can slow the spread of viruses (yellow fever, dengue, chikungunya) in mosquito populations.

Learn About Mosquitoes and Their Habitat Classroom Activity



- You can also look for information on genetic modification of mosquitoes, for example in Panama.
- You can look up information about insecticides. How can the use of insecticides effect other parts of the environment? For example, water, agricultural areas?

Discussion

- 1. Remember: In what forms can you find mosquitoes?
 - a. Eggs, larvae, pupae, adults
 - b. Life Cycle Figure 1 Mosquito Life Cycle <u>Beyond the Bite: GLOBE Mosquito</u> <u>Mission Disease Guide</u>
- 2. Read Proboscis Mosquito: Mechanics of a Bite
 - a. Discuss with the class.
 - b. How does this adaptation work? What are other adaptations of animals or plants?
- 3. Remember: Where do mosquitoes live? What are their habitats?
 - a. Use the cards to play <u>'Mosquito Habitats and Hideouts'</u> and find the mosquito habitats (stagnant water).

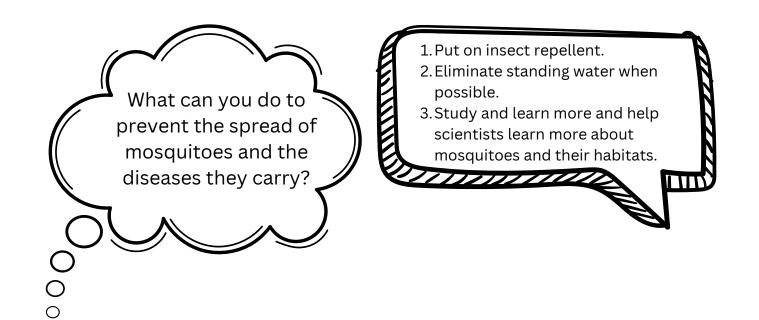
Where can you find mosquitoes?

- Discuss the individuals, population, community, species, niche, ecosystem.
 - For example, there is a population in a city, on a river.
- What is the niche of some mosquito species, are there species that prefer some habitats?
 - For example, *Aedes* mosquitoes prefer containers, and *Anopholes* prefer puddles or other more natural habitats

Use GLOBE's <u>Beyond the Bite: Mosquito Mission</u> <u>Disease Guide</u> for more information.

Learn About Mosquitoes and Their Habitat Classroom Activity

Further Discussion





Learn About Technology and Citizen Science Introduction of GLOBE

- 1. Remember magnification: Magnify that
 - a. Practice magnifying some things, you can use a hand lens, magnifying glass, or phone magnifier and take photos.
 - i. How to use a clip-on microscope (slide 86 in the Larvae Hunters Guide)
 - b. If you have mosquito larvae in your traps, you can count them and report the number in the GLOBE app (see upcoming activities).
- 2. Experiment: Build some mosquito traps in groups or individually and try to catch some larvae.
 - a. Use the guide <u>Let's build a mosquito larvae trap</u> (slide 38 and 39 in the <u>Larvae Hunters Guide</u>) to build a trap, you can leave the trap outside for a few days.
 - b. You can build traps at school and students can also build traps at home as an extension task.
 - c. What is your research question, your variables of interest?
 - i. For example, you can change the color of the trap (something dark, and something light).
 - ii. You can change the materials that are in the water (plants or grass, food, insect repellent).
 - iii. Where are you going to put your trap, in the sun, or in the shade.
- 3. Identify eggs, larvae, and pupae. Count the larvae, you can report the numbers in the GLOBE app.

a. Activities: Mosquito larvae Hunters Level 2

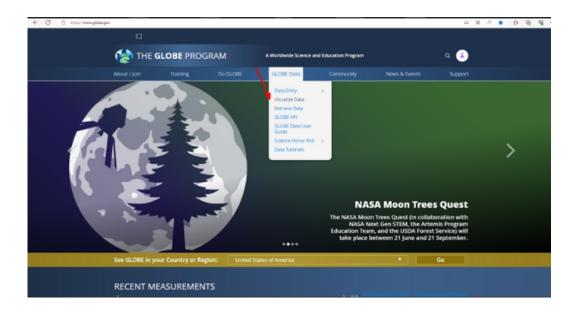


Note for teachers, if you don't have larvae in your trap after a week, you can use a black or dark colored bucket with a piece of wood between the water and the air (as a ramp so the female mosquitoes can stand on the ramp and lay their eggs in the water). Leave it open with grass in the water. Make sure you don't leave it for more than 5 days so you can ensure there are no adult mosquitoes.

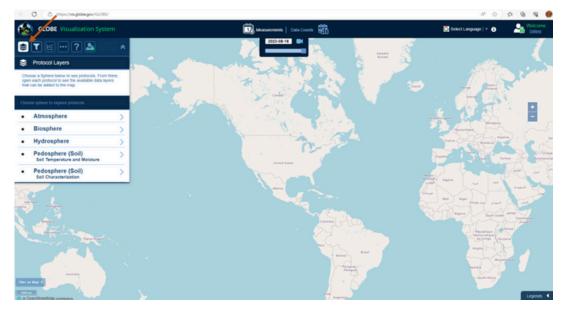
Learn About Technology and Citizen Science Introduction of GLOBE

Map scavenger hunt!

Use a computer to go to the *GLOBE website (https://www.globe.gov/)*, open 'GLOBE data', and go to 'Visualize data'

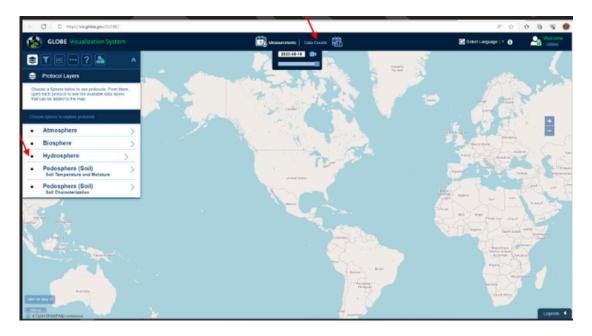


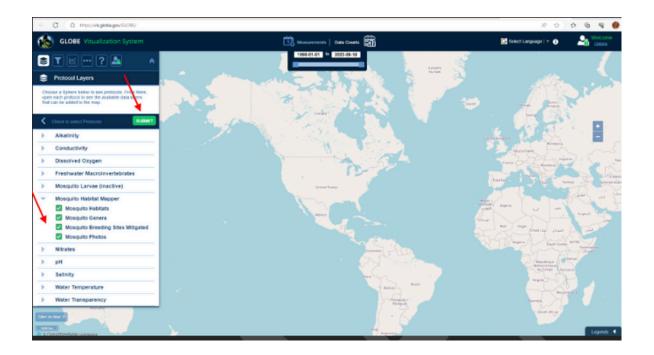
In the **'Visualization system'**, click on **'Enter the visualization system'** and click on the map layers.



Learn About Technology and Citizen Science Introduction of GLOBE

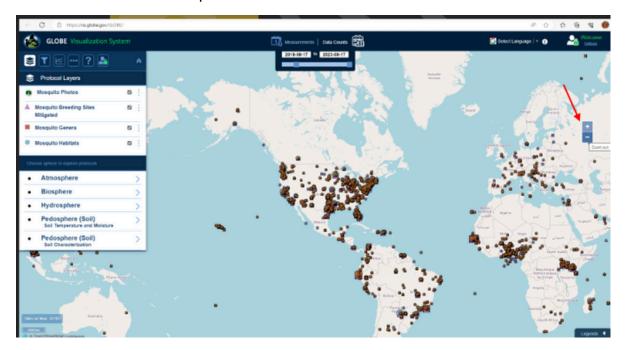
Click on 'Hydrosphere', and expand the 'Mosquito Habitat Mapper' layer, click on all the data layers. Choose 'Data Counts' at the top of the page and click 'SUBMIT'.



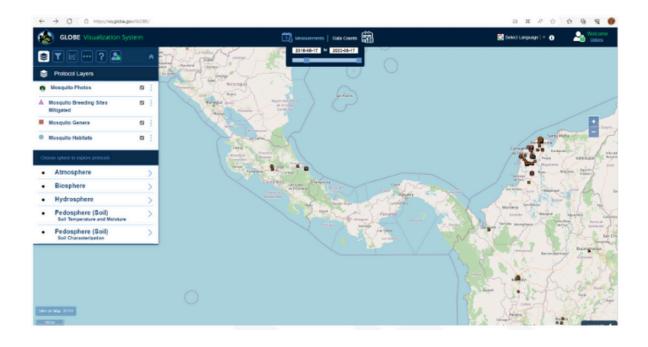


Learn About Technology and Citizen Science Introduction of GLOBE

Now you should see some points on the map, these are data. Explore the data, you can use the plus and minus on the right side of the page to zoom and you can use the mouse to move the map.



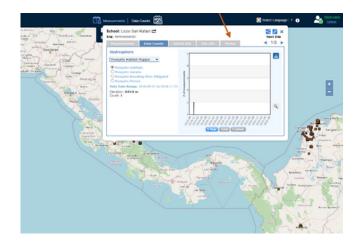
Use zoom and the mouse to find your country.

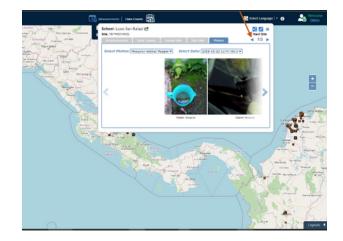


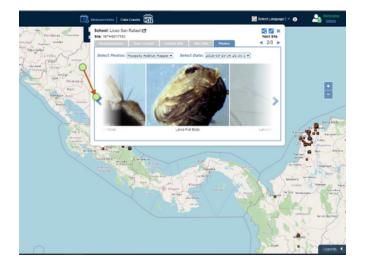
Learn About Technology and Citizen Science Introduction of GLOBE

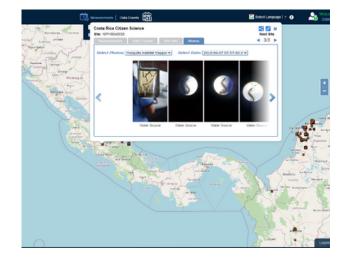
Scavenger Hunt!

Click on the dots, you can explore the tabs and pages.









Learn About Technology and Citizen Science Introduction of GLOBE

In small groups, search for data. Use GLOBE's <u>Beyond the</u> <u>Bite: Mosquito Mission Disease Guide</u>. Can you find the three genera of mosquitoes that transmit diseases (*Anopholes, Aedes, Culex*)? Where and when can they be found?

Explore the data. Look in other parts of the world. What do you think you can learn from this data? What can scientists learn from this data? Discuss with your group or class. What does this mean about disease transmission? For example,
can you find dengue fever in Africa? Why or why not? Use the
table in <u>Beyond the Bite: GLOBE Mission's Mosquito Disease</u>Guide to help explore the data and see how you can support the
information people have about these diseases.

What else can you learn about data? Work in small groups and then present to the class.

Which data is the most useful, and which is not useful? Why?

All these data were collected by citizen scientists. Do you want to try?

What is citizen science? - Citizen science is the voluntary contribution of time, effort, knowledge, or experience to scientific research



Contribute to Mosquito Habitat Map as a Citizen Scientist

Outside Activities

- 1. Go outside (of the school or on a field trip) and look for mosquito habitats.
- 2. Work in small groups. When you find habitat, put it on the map with the GLOBE app, you can watch a <u>video</u> on how to use the app. If you don't have a phone with the app, use the <u>Habitat Survey Page</u>.
- 3. You can continue to the 'Land Cover' page in the GLOBE app, after the 'Mosquito Habitat Mapper'.
- ...Congratulations! You have contributed to global citizen science!





Using your mosquito trap or if you have water samples with larva, continue here.

- 1. Can you count and identify some larvae?
 - a. Use the Larvae Hunters Level 2
 - b. Identify the eggs, larvae, and pupae.
 - c. Count the larvae, you can report the numbers in the GLOBE app.
- 2. If you find larvae, you can collect data on the larvae.
 - a. You can put your data into the GLOBE app or the <u>Habitat Survey Page</u>, and then into the GLOBE app.

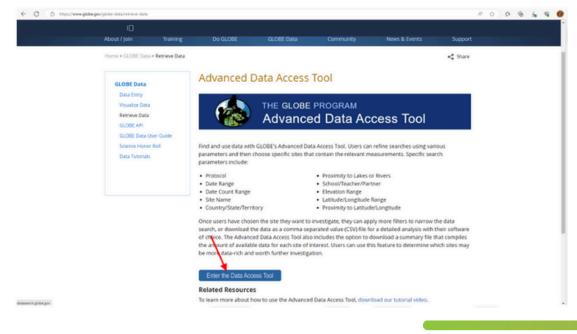
Contribute to Mosquito Habitat Map as a Citizen Scientist Outside Activities

Find Data

Use a computer to go to the GLOBE website (https://www.globe.gov/), open 'GLOBE data', and go to 'Retrieve data'.



Go to 'Enter the data access tool' and click.



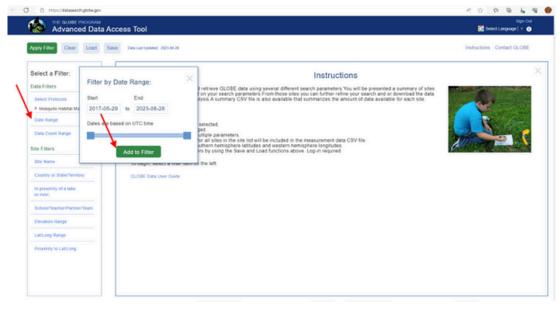
Contribute to Mosquito Habitat Map as a Citizen Scientist

Outside Activities

Go to 'Select protocol', click and choose 'Mosquito Habitat Mapper', click 'Add to Filter'.

| Apply Filter Clear | Filter by Protocol: | | × | Instructions Contact GLOBE |
|---|--|---|--|----------------------------|
| Select a Filter: Data Filter: Select Protocols Date Range Data Court Range Site Filters Site Name County or State/Term In proximity of State/Term | Artosphere Ar Temperature Dalles Ar Temperature Notoss Ar Temperature Notoss Brometric Pressure Notos Caudo Morsos Caudo Morsos Precipation Monthiss Precipation Monthis | Hydrosphare Asalinity Conductively Freshwater Macconversibratos Mosquito Lamee (inactive) Mosquito Lamee (inactive) Mosquito Lamee (inactive) Mosquito Lamee (inactive) Natures Natures Natures Salinity Valuer Tampenature Valuer Tampenature Valuer Tampenature Valuer Tampenature Valuer Tampenature Valuer Tampenature Valuer Tampenature | Instructions wearch parameters You will be presented a summary of sites source further refere your search and or download the data summarizes the anount of data available for each site. | |
| Elevation Range | | | | |
| Latitiong Range | | | | |
| Prexently to Latitiong | | | | |

Add a range of data, probably all the data that is available. Click 'Add to Filter'.





Add a country. Enter a country and click 'Add to Filter'.

| Advanced Data Access Tool | Sign Out Select Language Y 🕐 |
|--|-----------------------------------|
| | |
| Apply Filter Cloar Load Savo Ows.Lettypelmer. 2023-39-39 | Instructions Contact GLOBE |
| Select a Fifter: Definition: Definition: Select a Fifter: Notation instantinger: The definition: Notation: Select a Fifter: Not: Select a Fifter: Not: <th>×</th> | × |

Click on 'Apply Filter' and then on 'Obtain Measurement Data'.

| Advanced Da | | ess Tool | | | | Sign C Select Language + (|
|-------------------------------------|------|---|---|--------------------|-------------------|---------------------------------|
| Apply Filter Clear Load | Savo | Over Last Updated 2023-08-28 | | | | Instructions Contact GLOB |
| Select a Filter: | | Sites Found there by data range, the results above are | for the writes martif(s) selected. writed the CEV is to dicting the Ottor-Neurov | | | |
| Data Filters | | | ownicoid Summary Data | Nerver Land Burton | | |
| Select Protocols | - | | | | | |
| X Mosquito Habitat Mapper | | Ichui Kana | Site Name | Lattude | Lengtude Devotor | |
| | | Cesta flica Otgan Soance | 17960609180 | | -83.34591 14.8 | |
| Date Range | ÷. | Costa Rica Citizen Science | 170406641146 | | -83.33488 14.4 | |
| | | Costa Rica Otaes Science | 1790660147 | 33.07575 | -40.33087 12.8 | |
| × 2017-05-29 to 2023-08-28 | | Costa Rica Otizen Science | 1784047400037 | 6.99623 | -63.04043 63.3 | |
| | | Cesta Rica Citizen Science | 179606752045 | 5.98544 | 43.05067 6.3 | |
| Data Count Range | | Cesta Rica Citizen Science | 170404754007 | 6.67622 | 43.0488 4.5 | |
| | | Custa Rica Otgan Science | 179404754030 | 6.67912 | -43.040811 5 | |
| | ¥ . | Costa Rica Otgan Science | 179404740008 | 5.99723 | -83.04045 02.7 | |
| Site Filters | U. | Cesta Rica Citizen Science | 179804760056 | 5.99542 | -83.04344 59.2 | |
| | 2 | Cesta Rica Citawi Science | 36PH6040123 | 6.96825 | -84.23471 842.1 | |
| Site Name | 2 | Giceo San Rufael | 36PH504DH32 | 5.90244 | -84.22472 843.3 | |
| | μ. | Liceo San Rufael | 20PH5044032 | 5.50244 | -04.22281 044.9 | |
| Country or State/Territory | ¥. | Uceo San Rafael | 26P+5045833 | 5.95823 | -84,22299 846.7 | |
| | 2 | Liceo San Rufael | 36PH6040106 | | -84.3256 836 | |
| × Costa Rica | ×. | Liceo San Rufael | 06Pe60s7u55 | | -04.34740 11251.3 | |
| | ¥. | Liceo San Rufael | 179404729007 | 5.99522 | -83.04408 01.4 | |
| Is preximity of a take or river. | | | | | | |
| SchoovTeacher/Partner/Team | | | | | | |
| Elevation Range | | | | | | |
| Lati/Long Range | | | | | | |
| Prevently to Latitiong | | | | | | |

Level 10-11 (12) Contribute to Mosquito Habitat Map as a Citizen Scientist Outside Activities

It may take a few minutes, especially if there is a lot of data. When you finish, click 'Download'.

| Select a Filter: Image: Control of the Control of t | Advanced Data | Acces | ss Tool | | | | 🚮 Select Language 🔻 🌒 |
|--|------------------------------|---------|---|---|---------------------|-------------------|----------------------------|
| Select a Filer: Data Filer: Data Filer: Data Filer: Data Filer: Data Filer: Select Protocols Data Siler: Data Siler: V seguita Institut Magger Data Roc Cens Sono Instead Data Roc Cens Sono Instead Listration Data Roc Cens Sono Instead Listration Data Roc Cens Sono Instead Listration Data Siler: Onta Roc Cens Sono Instead Data Roc Cens Sono Instead Listration Data Siler: Onta Roc Cens Sono Instead Data Siler: Onta Roc Cens Sono Instead Outa Roc Cens Sono Instead Listration Data Court Riange Instead Batter Siler: Outa Roc Cens Sono Instead < | Apply Filter Cear Load | Save | Overland updated 2021-06-26 | | | | Instructions Contact GLOBE |
| Data Filters Control Monument Outs (-50) Control Summer Outs (-50) Behold Products Send Mendo Instant Links (-1,100) Exercise Data Filters Send Mendo Instant Links (-1,100) Exercise Data Filters Control Roc Clean Source Instant Links (-1,100) Links (-1,100) State Filters Control Roc Clean Source Instant Links (-1,100) Links (-1,100) State Filters Control Roc Clean Source Instant Links (-1,100) Links (-1,100) State Filters Control Roc Clean Source Instant Instant Links (-1,100) Links (-1,100) State Filters Control Roc Clean Source Instant Instant Links (-1,100) Links (-1,100) State Filters Control Roc Clean Source Instant Instant Instant Instant Instant County or State/Testady Counts Roc Clean Source Instant Instant Instant Instant Instant Counts Count Roc Clean Source Instant Instant Instant Instant Instant | Select a Filter: | Part Sh | ning by data range. The results shown are for th | e antre monthis palached. Na file Chintas de Calante de Calante Indexesses | and finder in these | | |
| X Mologias Habitat Mageri Datase Datase Cire Range Control Co | Data Filters | | | _ | | | |
| X Loss Son Rue UNMAX166 LLAND 4.1268 144 Dute Runger Ont Rue Clem Sones UNMAX166 LLAND 4.1268 144 Dute Runger Ont Rue Clem Sones UNMAX167 LLAND 4.1268 144 X 2017-05-2510 Ont Rue Clem Sones UNMAX167 Rules 133 X 2017-05-2510 Ont Rue Clem Sones UNMAX167 Rules 134 X 2017-05-2510 Ont Rue Clem Sones UNMAX167 Rules 134 Star Court Runge Ont Rue Clem Sones UNMAX167 Rules 134 3 Star Court Runge Ont Rue Clem Sones UNMAX168 97072 87080 271 Star Runge Ont Rue Clem Sones UNMAX168 97072 87080 271 Star Runge Ont Rue Clem Sones UNMAX168 97072 87080 271 Star Runge Unes Son Rulei UNMAX168 97072 87080 271 Star Runge Unes Son Rulei UNMAX168 97072 870800 271 <td>Select Protocols</td> <td>-</td> <td>and the second se</td> <td></td> <td>100.0</td> <td></td> <td></td> | Select Protocols | - | and the second se | | 100.0 | | |
| Control Recification LTMMML[14] LE1/M44 - 432488 144 Data Rangin Control Recification LTMMML[147 LE1/M44 - 432488 144 Startingin Control Recification LTMMML[147 LE1/M44 - 432488 144 X 2917-06-2910 2020-06-28 Control Recification LTMMML[147 Bit 700 Cuta Court Rangin Control Recification LTMMML[147 Bit 700 Cuta Court Rangin Control Recification LTMMML[147 Bit 700 Cuta Court Rangin Control Recification LTMMML[147 Bit 700 Star Filters Control Recification LTMMML[147 Bit 700 Courts (and Recification LTMMML[147 Bit 700 Bit 700 Courts (and Recification Ltere Star Refiel Ltere Star Refiel Bit 700 Courts (and Recification Ltere Star Refiel Ltere Star Refiel Ltere Star Refiel Courts (and Refiel Ltere Star Refiel Ltere Star Refiel Ltere Star Refiel Courts (and Refiel Ltere Star Refiel Ltere Star Refiel Ltere Star Refiel <tr< td=""><td>N COLUMN TO COLUMN TO COLUMN</td><td></td><td></td><td></td><td></td><td></td><td></td></tr<> | N COLUMN TO COLUMN TO COLUMN | | | | | | |
| Dute Range © Onto Ruo Clease Source LIMINE LIMINE ST LIATEST 413757 X 2017-05-25 to 2020-06-26 © Onto Ruo Clease Source LIMINE ST 413 Data Count Range © Onto Ruo Clease Source LIMINE ST 413 Data Count Range © Onto Ruo Clease Source LIMINE ST 413 Solar Count Range © Onto Ruo Clease Source LIMINE ST 413 Solar Count Range © Onto Ruo Clease Source LIMINE ST 413 Solar Count Range © Onto Ruo Clease Source LIMINE ST 413 Solar Count Range © Onto Ruo Clease Source LIMINE ST 413 Solar Ruo Clease Source LIMINE ST 413 3 Solar Ruo Clease Source LIMINE ST 414 3 Solar Ruo Clease Source LIMINE ST 414 3 Solar Ruo Clease Source LIMINE ST 414 3 Source Source Source Source LIMINE ST 414 3 Source Ruo Clease Ruo Market < | A Mosquito Habitat Mapper | | | | | | |
| Class Ruge • Octor Koo Class Sonice IMMOVMOR 9.451 X 2017-05-23 to 2212-05-28 • Octor Koo Class Sonice IMMOVMOR 4.3 • Octor Koo Class Sonice IMMOVMOR Ready for Council at 5.3 • Octor Koo Class Sonice IMMOVMOR Ready for Council at 5.3 • Octor Koo Class Sonice IMMOVMOR Ready for Council at 5.3 • Octor Koo Class Sonice IMMOVMOR 8.4400 Star Koo Class Sonice IMMOVMOR 8.4400 8.4100 Star Name Ucces Sonifiel 1986164023 9.41206 • Ucces Sonifiel 1986164023 9.4120 44228 • Ucces Sonifiel 1986164023 9.41206 44228 • Ucces Sonifiel 1986164023 9.41206 44228 • Ucces Sonifiel </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> | | | | | | | |
| X 2011-05-29 to 2020-06-28 Orde Ro Costes Some Control Ro Costes Some Costes | Date Range | | | | | | |
| Control Contro Control Control Control Control Control Control Control Control Co | | | | | P.379827 | | |
| Cotas Courti Range Cotas Rouce Reactinges Source State Fishers Cotas Rouce Reactinges Source Cotas Rouce Reactinges Rouce Cotas Rouce Reactinges Rouce Cotas Rouce Rouce Reactinges Rouce Cotas Rouce Rouce Rouce Rouce Reactinges Rouce Cotas Rouce Rouce | × 2017-00-29 to 2023-00-28 | | | | | | |
| Costa Court Range • Onto Kou Collesi Sonice 1 Medinated State Fatars • Onto Kou Collesi Sonice 1 Medinated State Fatars • Onto Kou Collesi Sonice 1 Medinated State Fatars • Onto Kou Collesi Sonice 1 Medinated State Fatars • Onto Kou Collesi Sonice 1 Medinated State Name • Collesi Sonichel 1 Medinated • Collesi Sonichel 1 Medinated 9 Media • Collesi Sonichel 1 Medina | | | | | oad | | |
| State Fitters 0 | Data Court Range | | | | 1.00.271 | AT 18 19 19 19 19 | |
| Stab Fittars P Ceta Roc Otem Source 1944010020 944024 442101940.1 Bite Name P Loce Sam/Andel 1944010022 94444 442101940.1 Bite Name P Loce Sam/Andel 1944010022 94444 442101940.1 Bite Name P Loce Sam/Andel 1944010022 94444 442201940.1 Courty or State/Tentary P Loce Sam/Andel 1944014028 94809 442201940.7 X Costra Roa P Loce Sam/Andel 1944014028 94809 45239440.7 X Costra Roa P Loce Sam/Andel 1944014028 94809 45249 V Loce Sam/Andel 194401729 94809 45249 151.3 V Loce Sam/Andel 194401729 94809 45249 151.3 V Loce Sam/Andel 1944017483* 94809 452496 154.4 Is priximp of a take or inter: Isolation (Tacher/Fault | | | | | | | |
| Sale 7 tables 9 Loses Sam/Melel 19440140312 9.9444 442/02 49.3 Sale 7 tables Loses Sam/Melel 19440140312 9.9444 442/02 49.3 Sale 7 tables Loses Sam/Melel 19440140312 9.9453 442201 49.3 County of State/Tearlisty Loses Sam/Melel 19440140313 9.9533 442208 49.7 County of State/Tearlisty Loses Sam/Melel 1944010315 8.2707 442340 58.8 I prissinity of a table or invert Loses Sam/Melel 1944017657 9.48246 68.4 | | | | | | | |
| Ste Nume v Loss Sim/Med 1940/04/02 Courty of Stabilishtsy v Loss Sim/Med 1940/04/02 Courty of Stabilishtsy v Loss Sim/Med 1940/04/02 V Costa Rica 1940/04/02 9.4228 44228 V Costa Rica 1940/04/02 9.4228 4428 V Costa Rica 1940/04/02 9.4228 4429 V Costa Rica 1940/04/02 9.4228 4429 Is prixinty of a talk or ner: v Loss Sim/Med 1940/04/02 Elevation Range V V V V | Site Filters | | | | | | |
| State Nume © Losses Sam Advand 1944501-001 Country of State-Teartiers Exect Sam Advand 1944501-001 Country of State-Teartiers Exect Sam Advand 1944501-001 V Coola Roca Exect Sam Advand 1944501-001 Is presently of a table or inferent Exect Sam Advand 1944501-001 Elever Sam Advand 1944501-001 844206 Elever Sam Advand 1944501-001 84420 | | | | | | | |
| County of State/Tentory P Lees Sen/Med 1984/00018 9.2007 46208 081 X Costa Rica Image: Sen Xead 1984/01203 10.4019 10.4019 10.101 X Costa Rica V Lees Sen/Med 1984/01203 10.4019 10.101 Is presently of a late or here: Documents and the or here: 1984/01203 1984/01203 1984/01203 Edwardson Hampe Edwardson Hampe 1984/01203 1984/01203 1984/01203 | Site Name | | | | | | |
| Country of State/TextBox P Less Sex/Med 104901/103 104791 X Coola Roa V Less Sex/Med 119401/103 84822 11 press/method List Sex Method 119401/103 84822 School/TextBox/Text | | | | | | | |
| X Costa Roca V Loss Sex Model Lineoryteps1 Is prisinity of a late or new: | Country or State/Territory | | | | | | |
| Is prisimp of a take or rever Schoostfeischer Partner Team | Y Course Back | | | | | | |
| or neer: BohooutTeacher/Partner/Team Elevation Range | A CONSINCE | | | | | | |
| Elevation Range | | | | | | | |
| | School/Teacher/Partner/Team | | | | | | |
| Lazing Range | Elevation Range | | | | | | |
| | Lat/Long Range | | | | | | |

You can open or save the data.

Explore data.

- a. In small groups explore the data. What can you learn from the data? For example:
 - i. What is the most common life stage to find mosquitoes? (larvae, pupae, adults). Search in P-Q columns.
 - ii. What are the most common genera, the most common species found in the selected area? (U-V columns)
 - iii. What else can you learn about the data? Work in small groups and then present to the class.
 - iv. Which data is the most useful, and which is not useful? Why?
 - 1. You can also 'clean the data', for example you can delete data you don't want to use or change the titles (in the first two rows).

Contribute to Mosquito Habitat Map as a Citizen Scientist

Outside Activities

Note: The first latitude and longitude data (columns E-F) are not very accurate, the values in columns AC-AB are more accurate, you should use these if you want to use latitude and longitude.

| Advanced Dat | | - All | | | | Downloads | | 09. | - 0 | Ľ, |
|-----------------------------|--|---------------------------------------|---|----------------|------------------------------------|----------------------|-----------------|----------|-----|----|
| Auvanceu Dat | arnocess in | | | | | 1 What do you want t | e de with GLOBI | Manurer. | . × | Ľ |
| | | | | | | Open | Save a | • ¥ | | |
| pply Filter Clear Load | Save Debu | of Updated. 2823-88-28 | | | | | | | | ٤. |
| | | | | | | See more | | | | |
| | 16 Sites | Found | | | | | | | | |
| Select a Filter: | What theirs to di | de range. The results shown are for t | te artire month() pain-fail | | | | | | | |
| | To other the data is | pechi to the cates selected, down | ad the CBV file by choing the 'Ottain Measurement | t Dear button. | | | | | | |
| leta Filters | Download M | leasurement Data (~34) | Download Summary Data | | | | | | | |
| Select Protocols | E Sheels | | Sta fame | Labor | Largeds Easter | | | | | |
| X Mosquito Habital Mapper | | a Otzen Science | 179404(20100 | | -83,34591 (4.9 | | | | | |
| | | a Citaen Science | 179404401146 | | 43.33488 34.4 | | | | | |
| | W CHIPRO | a Otzen Science | 17900402147 | 10.07575 | -83.30297 12.8 | | | | | |
| Date Range | Costa Ro | a Otgan Science | 17940/56017 | 8.99622 | -613-045-613 | | | | | |
| X 2017-05-29 to 2020-08-28 | | a Otaen Science | 17969052045 | 3.06344 | 43.10067 6.3 | | | | | |
| | Conta Ru | a Otgan Science | 17940054127 | 9.07922 | 42.0488 4.5 | | | | | |
| Annual and Annual | | a Otaen Science | 13494394138 | | 43.04681.5 | | | | | |
| Data Court Range | | a Citzen Science | 17940/05038 | | -83.04046 62.7 | | | | | |
| | | a Otaen Science | 179494740056 | | -83.04048 55.1 | | | | | |
| ite Filters | | a Otzen Science | 19940040600 | | -84.32471 842.3 | | | | | |
| | R Liter Set | | 16740140102 | | -84.22472 843.3 | | | | | |
| Site Name | Lices Set Lices Set | | 16946044632 | | -04.32381 844.9 -84.32389 846.7 | | | | | |
| | V Loss Ser | | 16740142106 | | -84.2256 836 | | | | | |
| Country or State/Territory | Core Set | | 14245017125 | | -84,34748 1251,3 | | | | | |
| | Lites Set | | 17940/759017 | | 41.0405 61.4 | | | | | |
| X Costa Rica | | | T-10-1900 | P PP AND | | | | | | |
| | | | | | | | | | | |
| In proximity of a take | | | | | | | | | | |
| er ilver. | | | | | | | | | | |
| School Teacher Partner/Team | | | | | | | | | | |
| Elevation Range | | | | | | | | | | |
| Lattong Range | | | | | | | | | | |
| Proximity to Latiliang | | | | | | | | | | |

| File | - | incert Dree | | | uta Review View | | helo | | - | | | | | | | | Share |
|------|---|-------------|----------------------|--|--|---------------------------------|----------------|---|---|---|--|---------------------|--------------------------------|----------------|---|---|-------|
| | X Cut Copy - Ø Format Fair Outward | ter B I | 2 - 10 - 12 - Not | | The sector of th | | 5 - % 9 | Conditional Format Formating * Table | Normal Calculation | Bad Energy (CIII | Good Explanatory | Neutral | | at Delete Form | | | |
| 3 | • [1] | × • . | A organisation | d U | Adheria | | active of | | | pipers - | | | | 100 | . Lang | (second) | |
| ä | F. | G | н | 1 | J | K | L | м | N | 0 | P | Q | R | s | т | U | |
| 1 | ongitude | elevation | measured on | mosquito habitat mapper:m osquito habitat mapper id | habitat mapper:data | mosquito habitat mapper:u | mapper: | | mosquito habitat mapper: water source | mosquito habitat mapper:larvae count | mosquite habitat mapper: mosquite eggs | mapper: mosquito | mosquito habitat mapper: | mosquito | mosquito habitat mapper:last identify stage | mosquito habitat mapper;g enus | hab |
| | | | | | | rd in Coord | finated Un | iversal Time (UTC) | | | -00- | | | | | | |
| 3 | -84.2247 | 842.1 | 6/27/2019 | 13503 | GLOBE Observer | 5.8E+07 | 2019-06- | 2 container: artificial | jar | 1 | S FALSE | | FALSE | FALSE | identify-aedes-tuft | Aedes | |
| 4 | -83.3459 | 14.9 | 9/1/2018 | 4275 | GLOBE Observer | 4.7E+07 | 2018-09 | Container: artificial | dish or po | | 2 FALSE | | TRUE | FALSE | identify siphon-pecten | | |
| s | -83.3459 | 14.9 | 9/1/2018 | 4274 | GLOBE Observer | 4.7E+07 | 2018-09- | Container: artificial | dish or po | | 1 FALSE | | TRUE | FALSE | identify siphon-pecten | | |
| 5 | -83.3459 | 14.9 | 9/1/2018 | 4276 | GLOBE Observer | 4.7E+07 | 2018-09- | Ccontainer: artificial | dish or po | | 1 FALSE | | TRUE | FALSE | identify siphon-pecten | | |
| | -83.3459 | 14.9 | 9/1/2018 | 4277 | GLOBE Observer | 4.8E+07 | 2018-09- | Container: artificial | animal tro | ough or water bo | w | | | | | | |
| 1 | -83.3349 | 14.4 | 9/2/2018 | 4283 | GLOBE Observer | 4.7E+07 | 2018-09- | Cstill: lake/pond/swar | ditch | | FALSE | | TRUE | TRUE | identify-siphon-hairs | | |
| | -83.334 | 12.8 | 9/3/2018 | 4284 | GLOBE Observer | 4.7E+07 | 2018-09- | Cstill: lake/pond/swar | ditch | | FALSE | | TRUE | TRUE | identify-siphon-hairs | | |
| 0 | -83.0507 | 6.3 | 9/22/2018 | 4529 | GLOBE Observer | 4.8E+07 | 2018-09- | 2 container: artificial | flower or | plant pot/tray | | | FALSE | | identify-aedes-thorax | Aedes | int |
| 1 | -83.0507 | 6.3 | 9/22/2018 | 4530 | GLOBE Observer | 4.8E+07 | 2018-09- | 2 container: artificial | flower or | 1 | 1 FALSE | | FALSE | FALSE | | Aedes | ae |
| 2 | -83.0507 | 6.3 | 9/22/2018 | 4533 | GLOBE Observer | 4.8E+07 | 2018-09- | 2 container: artificial | discarded | 1 | 5 FALSE | | FALSE | TRUE | identify-later | | |
| 3 | -83.0488 | 4.5 | 9/23/2018 | 4548 | GLOBE Observer | 4.8E+07 | 2018-09- | 2 container: artificial | flower or | plant pot/tray | FALSE | | FALSE | FALSE | identify-siphon-pecten | | |
| 4 | -83.0488 | 5 | 9/23/2018 | 4549 | GLOBE Observer | 4.8E+07 | 2018-09- | 2 container: artificial | jar | | 5 FALSE | | FALSE | FALSE | identify-basal-tuft | | |
| 5 | -83.0434 | 59.1 | 9/23/2018 | 4555 | GLOBE Observer | 4.9E+07 | 2018-09- | 2 container: artificial | dish or po | () () () () () () () () () () | 1 FALSE | | FALSE | FALSE | identify-saddle | | |
| 6 | -83.0434 | 59.1 | 9/23/2018 | 4557 | GLOBE Observer | 4.9E+07 | 2018-09- | 2 container: artificial | dish or po | () () | 2 FALSE | | TRUE | FALSE | identify-aedes-tuft | Aedes | |
| 7 | -83.0434 | 63.3 | 9/22/2018 | 4526 | GLOBE Observer | 4.8E+07 | 2018-09- | 2 container: artificial | dish or po | et | | | FALSE | | | | |
| 8 | -83.0434 | 63.3 | 9/22/2018 | 4527 | GLOBE Observer | 4.8E+07 | 2018-09- | 2container: artificial | jar | | 1 | | FALSE | | identify-verify-larva | Aedes | in |
| | 93.0434 | 63.3 | 0/00/0018 | 46.34 | CLOPE Obvious | 4.95-07 | 3019.00 | Intelligent statistics of | other | | . CALCE | | EALCE | EALCE | Mantifu and dis comb | | |

Contribute to Mosquito Habitat Map as a Citizen Scientist

Outside Activities



Global opportunity for students - International Virtual Science Symposium: The <u>International Virtual Science Symposium</u> is an opportunity for GLOBE students to showcase their research to the rest of the community. Projects are judged by prestigious scientists from dozens of GLOBE countries. Students are eligible to receive GLOBE stipends and badges.

Links

| GLOBE | https://www.globe.gov/ |
|--|--|
| Video | https://www.youtube.com/watch? v=Jh_chDc_HCE |
| International Virtual Science Symposium | https://www.globe.gov/news- events/meetings_symposia/virtual- conferences |
| Mosquito Habitats Resource Library - GLOBE Observer | https://observer.globe.gov/do-globe- observer/mosquito- habitats/resource-library#activities |
| Resources - Mission Mosquito - GLOBE.gov | https://www.globe.gov/web/mission- mosquito/overview/resources |
| Eyes on the Earth (nasa.gov) | https://eyes.nasa.gov/apps/earth/#/ |
| Earth Map | https://earthmap.org/ |

Materials in Appendices

The activities in this guide are suggestions, any activity can be freely used for educational purposes. Many of the activities and resources were created by the Institute for Global Environmental Strategies as part of the NASA-funded GLOBE Mission Mosquito (part of the NASA Earth Science Education Collaborative project). Others were created by the UCAR Center for Science Education. There are links throughout the guide to these activities, which are also provided below. Please refer to the original documents for more information.

Resources from IGES:

Note that these activities are also available as a collection titled <u>Mission Mosquito Larvae</u> <u>Hunters Guide</u>. The guide is formatted as Google Slides, which can be copied and saved for offline use. That format allows creative customization. For example, work through the guide individually, in teams, or in small groups on separate computers. Display on an interactive whiteboard for large group collaboration. Selectively print, add, or hide pages not used. The guide is licensed under a <u>Creative Commons Attribution-NonCommercial 4.0 International</u> <u>License</u>. You are free to share and adapt this material as long as you follow the license terms, and link to the original source at: https://strategies.org/products/mosquito-larvaehunters-guide

- Mosquito Larvae Hunters
 - Level 1 Training (PDF), Badge (PDF)
 - Level 2 (Training (PDF), Badge (PDF), Certificate (PDF))
 - Companion guide for parents/caregivers: in <u>Color</u>, or in <u>Black-and-White</u>
- **Mosquito Habitat Survey:** Instructions and a paper data sheet to do a survey of mosquito habitats over several days.
- **Proboscis: Mechanics of a Bite**: An activity to teach how mosquitoes use their proboscis to bite, including a diagram, video, and poem.
- How to Use a Clip-on Magnifier: Tips with graphics on photographing mosquito larvae using a clip-on scope with a smart phone.
- <u>Build a Mosquito Larvae Trap</u>: Build a do-it-yourself mosquito trap using simple materials. The trap tricks mosquitoes into laying their eggs in a container that the larvae can't escape.
 - Report the larvae using the Mosquito Habitat Mapper tool in the GLOBE Observer app. <u>Video demonstrating how to build the trap</u>
- <u>Mosquito Habitats and Hideouts</u> : Play this game to learn the different habitats in the GLOBE Mosquito Habitat Mapper
- <u>Beyond the Bite</u>: GLOBE Mission Mosquito Disease Guide. Learn about eight of the most common Mosquito-borne diseases.
- Resources from UCAR Center for Science Education
 - Elementary GLOBE activity, Magnify That
 - <u>Zika Zine</u>

Materials in Appendices

The activities in this guide are suggestions, any activity can be used. Many of the materials come from NASA's (National Aeronautics and Space Administration) GLOBE (Global Learning and Observations to Benefit the Environment) program and are free to use for educational purposes. A link should be provided if changes are made to the GLOBE program documents. There are links to the documents in the guide and at the end of the document. Please refer to the original documents for more information.

- <u>Mosquito larvae Hunters Level 2 https://strategies.org/wp-content/uploads/2021/07/1-</u> <u>MLH-SecondEntry-Final-7-27-2021.pdf</u>
- <u>Habitat Survey Page https://strategies.org/wp-</u> content/uploads/2020/09/HabitatSurveyPage-COLOR-FINAL-9-28-20-2.pdf
- <u>Mosquito Proboscis: Mechanics of a Bite https://strategies.org/wp-</u> content/uploads/2021/05/1-HiRes-COLOR-Proboscis-Entry-FINAL-5-11-21.pdf
- <u>Magnify that -</u> <u>https://www.globe.gov/documents/348830/55942515/MagnifyThat_27July2018_FINAL.</u> <u>pdf/a40f605a-f86f-4293-8ff0-17d82f359f7e</u>
- <u>Mosquito Larvae Hunter: Level 1 https://strategies.org/wp-</u> content/uploads/2021/05/MLH-5-10-2021.pdf
- <u>Mission mosquito: Larvae hunters guide https://strategies.org/products/mosquito-</u> <u>larvae-hunters-guide</u>
- <u>How to use a clip-on microscope -</u> <u>https://docs.google.com/presentation/d/1lb8pssP4nyvhsSwHY-g2-</u> <u>FUNHKwKE80Y85zxteu7YUE/view#slide=id.g14711c42f4e_1_27</u>
- Let's build a mosquito larvae trap https://observer.globe.gov/documents/19589576/721d105e-5cd7-b0fa-5db5-172fd30993ab
- <u>Beyond the Bite: GLOBE mission mosquito disease guide -</u> <u>https://strategies.org/products/beyond-the-bite</u>
- <u>ZIKA ZINE</u> <u>https://scied.ucar.edu/zikazine</u>
- <u>Mosquito Habitats and Hideouts</u> -https://strategies.org/products/mosquito-habitatsand-hideouts