Girl Scouts and GLOBE Observer
The Global Learning and Observations to Benefit the Environment (GLOBE) Program is an international science and education program that provides students and the public worldwide with the opportunity to participate in data collection and the scientific process and contribute meaningfully to our understanding of the Earth system and global environment.

The GLOBE Observer app is a GLOBE’s data entry tool that allows an international network of citizen scientists to work together to learn more about our shared environment and changing climate. GLOBE Observer currently accepts observations of Clouds, Mosquito Habitats, Land Cover and Trees.
What’s an Observation?

Hear  Smell  Touch  See  Taste
Observation

Mosquitoes need a source of water to breed. Anything that collects water could become a mosquito habitat.

Let’s look at a few pictures and use our sense of sight to make observations about where we might find breeding grounds for mosquitos.
Go on a Mosquito Habitat Hunt
Where do mosquito larvae live? I Spy...
Observations

- Conditions (temperature, precipitation, etc.)?
- Where were larvae present?
Observations

- Conditions (temperature, precipitation, etc.)?
- Where were larvae present?

Press Pause while you discuss.
Observation: Mosquito Larvae up close!
Observation: Virtual Mosquito Habitat Audit

Check off on your bingo card
Observation: Mosquito Habitats and Hideouts (Your turn!)

You can do this on your own if you can go outside with an adult.

1. **Bingo card** Mosquito Habitats and Hideouts scavenger hunt: check off any mosquito habitats when you find them.
2. **Mosquito Habitat Survey:** identify any larvae, pupa, or mosquitoes that are present.

### Tips on how to fill out your data

<table>
<thead>
<tr>
<th>Artificial container</th>
<th>Mosquito key</th>
<th>Date: Sept. 3, 2020</th>
<th>Temperature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal trough</td>
<td>Larva</td>
<td>☑️</td>
<td>High: 75°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low: 68°F</td>
</tr>
<tr>
<td></td>
<td>Pupa</td>
<td>☑️</td>
<td>Rain today?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Adult</td>
<td>X</td>
<td>Any mosquitoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>observed?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Artificial container</th>
<th>Mosquito key</th>
<th>Date: Sept. 14, 2020</th>
<th>Temperature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bucket</td>
<td>Larva</td>
<td>X</td>
<td>High: 78°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>Low: 60°F</td>
</tr>
<tr>
<td></td>
<td>Pupa</td>
<td>X</td>
<td>Rain today?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Adult</td>
<td>X</td>
<td>Any mosquitoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>observed?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Artificial container</th>
<th>Mosquito key</th>
<th>Date: Sept. 23, 2020</th>
<th>Temperature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garden or structure</td>
<td>Larva</td>
<td>X</td>
<td>High: 65°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>Low: 50°F</td>
</tr>
<tr>
<td></td>
<td>Pupa</td>
<td>X</td>
<td>Rain today?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Adult</td>
<td>X</td>
<td>Any mosquitoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>observed?</td>
</tr>
</tbody>
</table>

### Sheet has room for three separate observation days

- **Ditch**
- **Estuary**
- **Grill**
- **Hollows in plants**
- **Hollows in trees**
- **House or structure**
- **Lake or pond**
- **Mosquito nests**
- **Mosquito larvae**
- **Mosquito pupa**

**Learn More:** observer.globe.gov
What does a Scientist Do?
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1. Observe
2. Ask a Question
3. Make a Hypothesis
What does a Scientist Do?

1. Observe ✓
2. Ask a Question
3. Make a Hypothesis
Did you know: Vector borne illness mosquitoes usually prefer breeding in artificial containers.
Did you know: Vector borne illness mosquitoes usually prefer breeding in artificial containers.
Near where you live, are there more artificial or natural habitats for mosquitoes?
Make a Hypothesis

Answer your question based on observations.

There are more artificial containers near me.

There are more natural water sources near me.
Make a Hypothesis, then Collect Data

1) Answer your question based on observations.
2) Collect data to see if your hypothesis is correct.
Make a Hypothesis

Answer your question based on observations.

There are more artificial containers near me. There are more natural water sources near me.
How do scientists know if their hypothesis is correct?

Collect and Analyze Data
Collect and Analyze Data
Girl Scout Cookie Sales

Single Sale

Troop Sales

Total packages sold: 5
Total packages sold: 1,559

![Pie charts showing cookie sales distributions for single sale and troop sales.](image-url)
What about around in Oregon and SW Washington?

My yard is not a large data set.

We need MORE data!
Mosquito Habitat Data

https://vis.globe.gov/mosquitohabitats
The more data we get, the better the science can be.

And that’s why NASA GLOBE needs you!

We need your data!
Join GLOBE Observer: Mosquito Habitat Mapper
Mosquito Habitat Mapper Intro

https://youtu.be/YobgJJmN7YA?t=1055
Build a Mosquito Trap

Materials:
● clear plastic bottle
● netting (like tule)
● rubber band
● tape
● scissors or craft knife
● dark paper or fabric
● water

Build a Mosquito Trap Activity Instructions

Above: Steps 1-3 for building the mosquito trap.
Make Your Own Mosquito Trap

https://go.nasa.gov/3aGgU1S
Register your Troop on SciStarter
https://scistarter.com/girlscouts/volunteer/landing
Choose GLOBE Observer: Mosquito Habitat Mapper

Your Citizen Science Project:

GLOBE Observer: Mosquito Habitat Mapper

Description
Welcome to GLOBE Observer: Mosquito Habitat Mapper (GO Mosquito), an international citizen science initiative to understand our global environment. Locate and map locations of mosquito breeding sites (standing water), destroy container habitats so that mosquito larvae don’t develop into adults that spread disease, and learn more about mosquito prevention and control in your area. Besides promoting the collection of critical data for use by scientists and health officials, GO Mosquito helps us understand how we can make a difference to reduce the local risk and spread of mosquito-borne diseases. Safety checkpoint: Biting insect warning.

Project Instructions
Your troop volunteer will guide you in choosing a site and getting ready. Then, together, you will collect data for the first time.

You need to be 13 or older to log data yourself.

log data  log data (android)  log data (iOS)
Take Action

What can you do?

- Find mosquito habitats and dump the standing water if you are able.
- Create a program to teach other Girl Scouts about mosquitoes.
- Start a hiking group and take mosquito habitat observations as part of your walk.
- Take mosquito habitat and land cover observations from the same place in different seasons, then compare the changes from year to year and look for differences between the images to learn more about seasonal effects on the mosquito habitats and mosquito populations.
- Participate in the data challenges when they occur!
- Use the “Conducting a Mosquito Habitat Survey” (bit.ly/MosquitoHabitatSurvey) activity and data sheet to survey any mosquito habitats near you!
- GLOBE Observer app link or download from the App Store or Google Play.
- GLOBE Visualization System to see other citizen science data from GLOBE observers around the world. You can look for mosquito habitat pictures or check out data from the other GLOBE tools.
- NASA Worldview to explore current and past satellite data (yes, you can view data as early as today in near real time.)
- Video about how to take a mosquito habitat observation
- GLOBE Teams