

# ***WHAT ELSE IS LIVING IN YOUR MEGA:BITESS OVITRAPS?***

## **An Entomology MEGA:BITESS Lesson Plan**

**David Wehunt**, Teacher, Soddy Daisy High School

**Rebecca Trout Fryxell**, Associate Professor, Entomology and Plant Pathology, University of Tennessee

**Lynne Middleton**, State 4-H Curriculum Specialist, University of Tennessee



# What Else is Living in Your MEGA:BITESS Ovitrap?

## An Entomology MEGA:BITESS Lesson Plan

### Skill Level

Advanced (11th-12th graders)

### Learner Outcomes

The learner will be able to:

- Create a food web to show how the organisms found in water fit into the local wetland ecosystem and interact with each other, activities start outside but can be completed inside or outside
- Estimate mathematically the population size of the organisms found in the trap water sample.

### Educational Standard Supported

EVSC.LS2.2, EVSC.LS4.1

### Tags

4-H Science

### Time Needed

45-60 minutes

### Materials List

- Sealable containers to hold water
- Filter paper
- Dissecting and/or compound microscope
- Petri dish
- Slides with coverslips
- Turkey baster and/or pipette
- Tweezers
- Computer with internet access
- Terrestrial aquatic organism identification sheets

### Teacher Facilitated

Teacher should be familiar with population biology and ecosystems

### Authors

David Wehunt, Teacher, Soddy Daisy High School

Rebecca Trout Fryxell, Associate Professor, Entomology and Plant Pathology, University of Tennessee

Lynne Middleton, State 4-H Curriculum Specialist, University of Tennessee

### Introduction to Content

Learn about different types of organisms that live and/or develop in aquatic environments in terrestrial settings in your area. Pay particular attention to organisms found in wetlands and man-made structures such as containers. Look for native species and be prepared to identify non-native species. Look for types of relationships the organisms may have with each other. Educators can use their containers connected with MEGA:BITESS ([www.megabitess.org](http://www.megabitess.org)). **Alternatively**, educators can collect water from any container on a property and look at the water within it such as natural containers (e.g., tree hole, root holes, pond) and artificial containers (e.g., cups, bird bath, tire). The original lesson plan connected to this lesson plan can be found at the MEGA:BITESS website.

### Terms and Concepts

- Organism – an individual animal, plant or single-celled life form
- Species – organisms capable of producing reproductive offspring
- Population – all the inhabitants of a particular town, area or country
- Producer – an organism that produces its own food from simple substances (e.g., water, sun)
- Primary consumer – an **organism that feeds on primary producers**
- Secondary consumer – an **organism that feeds on primary consumers, may also feed on producers**
- Food chain – connection of energy, begins with producer ends with consumers
- Food web – **consists of all the food chains in a single environment**
- Ecosystem – a biological community of interacting organisms and their physical environment
- Biotic factors – **living organism that shapes and/or influences its environment**
- Abiotic factors – **a nonliving condition or thing (e.g., climate, habitat) that influences or affects an ecosystem and the organisms in it**
- Invasive species – a **species that is not native to the ecosystem and causes harm**
- Native species – a species that historically occurred in that ecosystem

### Introduction to Methodology

During this activity, students will:

- Identify different species found in selected samples of MEGA:BITESS traps
- Determine if there is a relationship between the organisms found in the MEGA:BITESS traps and the water.
- Create a food web of the area based on the organisms found in the MEGA:BITESS trap
- Speculate on what observed species support or are supported by these organisms.
- Calculate the area population of the organisms in the trap based on the number of each species found in the trap.

## Setting the Stage

Ask the students “*What organisms, besides the mosquitoes we are attempting to trap, also like the environment we created in the MEGA-BITESS trap? What attracts them to the trap?*”

## Experience

- 1) Students will randomly select a MEGA:BITESS trap BEFORE going out to service the traps. Alternatively, have students look around your location for natural and artificial containers holding water.
- 2) Collect the “used” or “old” water by pouring it into a sealable container (e.g., sealable bag, jar, container). Set it aside.
- 3) Once in the classroom, students will filter the water through filter paper into a second container to trap the organisms that were found in the water.
- 4) Using microscopes, students will examine the contents on the filter paper and the contents in the water to observe, catalog, count and record all the organisms. If possible, students should take pictures of all observed organisms (e.g., living/non-living).
- 5) Students will also attempt to identify the organisms found using the provided websites.
  - a. Guide to identification of freshwater microorganisms  
<https://www.msncore.org/watersheds/mission/plankton.pdf>
  - b. Pond dipping and insect identification sheet  
<https://www.rectory-farm.org.uk/assets/pond-insect-identification.pdf>
  - c. If images are taken, students can use Google Image Search to help identify specimens.
- 6) Next, students will create two tables (potentially a spreadsheet) that will organize/sort what was collected. Students will then write suspected relationships between the organisms collected. Using a blank sheet of paper, students will create a food web by writing the names of the organisms from that spreadsheet and then draw lines connecting the organisms in a food web. Students will determine additional categories to be added to the table of identified organisms.

*Bonus Activity:* Compare the specimens collected in natural and artificial containers. Ask questions about who, where and why those specimens were found and compare resulting food webs.

## Strategies to Increase Student Engagement

- Show a video of microscopic organisms living in a pond. Ask students to describe what they see. Then have students compare the mosquito trap to the pond. Ask “*Does the trap mimic the pond? If it does, how? If it does not, why not?*”

## Teacher Notes

## Share

Have students take photos through the microscope with their phone and share the images. Students should develop ideas as to why the organisms are in the trap and what their relationship is with the other organisms in the trap. Have them support their ideas with facts about the organisms.

- Ask students questions for a broader understanding, such as, *“Why are the organism in the trap? What is their relationship with the other organisms in the trap? What other facts do you know or do you need to know to understand what is happening in the trap?”*

## Process

The trap is intended to collect mosquito eggs from mosquitoes that lay their eggs in containers; however, just like a pond it collects other organisms as well. By collecting the water and examining what else is in the water students can develop a “profile” that can be compared to existing natural containers and predict what the ecosystem of the local containers might look like.

- Ask students questions for a deeper understanding, such as, *“What is the importance of observing and collecting data through these containers? What can the data we collect be used for?”*

## Generalize

Ponds have organisms that are beneficial and/or harmful to us. They can be beneficial directly (a food source for an organism that we eat) or indirectly (a microscopic predator to organisms that cause us harm). They can also be harmful in that some are vectors of pathogens that can cause disease. By learning more about what is present we can learn to act and prevent problems.

- Ask students questions focused on generalizing the experience, such as, *“Why is understanding an organism ecosystem important? What other organisms can we study in this way? What are other ways we can observe organisms in an ecosystem?”*

## Apply

We are first and foremost creating a model of a small part of the aquatic ecosystem in our area.

- Ask students questions focused to help students apply what they learned to their world. Example questions include *“How does understanding the ecosystem of mosquitos help us as we study them? Why is it important to study different organisms?”*

## References

Hack, A. 2010. "Pond dipping & Insect identification." Rectory Farm. <http://www.rectory-farm.org.uk/assets/pond-insect-identification.pdf>

Math/Science Nucleus. 2004. "Guide to Identification of Fresh Water Microorganisms." <https://www.ms-nucleus.org/watersheds/mission/plankton.pdf>

MEGA:BITESS ACADEMY. [www.megabitess.org](http://www.megabitess.org).

## Supplemental Information

### *Educational Standards Met*

Environmental Science: Academic Standards

EVSC.LS2: Ecosystems: Interactions, Energy, and Dynamics  
Develop an explanation of behavioral and physical adaptations organisms have for life in aquatic habitats with varying chemical and physical features.

EVSC.LS4: Biological Change: Unity and Diversity  
Construct an explanation based on scientific evidence for mechanisms of natural selection that result in behavioral, anatomical and physiological adaptations in populations.

### **TIPPS** *Life Skills*

- Critical thinking
- Decision making
- Keeping records
- Learning to learn
- Planning and organizing
- Problem solving

## Student Worksheet

### Identified Organisms

Organisms	Quantity	Native or Invasive

### Relational Table

Depending on how many different types of organisms you identify will determine how many rows and columns to create. If you identify 4 organisms, then you will need a 4 x 4 table. Describe the potential relationship between the two organisms. You do not need to write in boxes with an x, but you should describe the relationship in empty boxes.

Relationship	Organism 1	Organism 2	Organism 3	Organism 4
Organism 1	x	x	x	x
Organism 2		x	x	x
Organism 3			x	x
Organism 4				x



[UTIA.TENNESSEE.EDU](http://UTIA.TENNESSEE.EDU)

Real. Life. Solutions.™