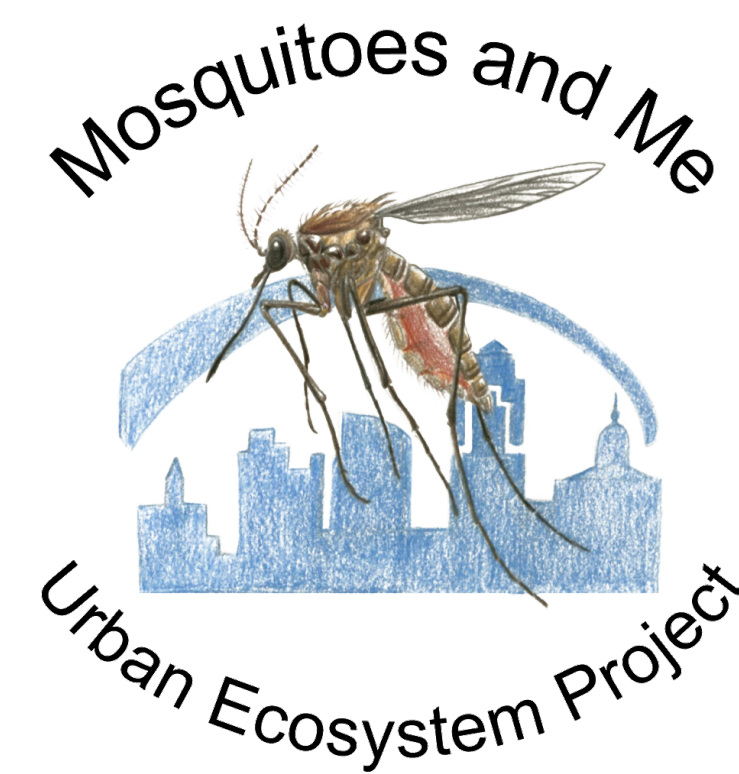


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NIH SciEd 2019



Urban Ecosystem Project: Mosquitoes & Me Summer Camp



Purpose

Urban Ecosystem Project: Young Scientists and Ambitious Teachers Improving Health in an Urban Ecosystem

- Specific Aim #1 – Enhancing Science Learning of Youth**
Achieved through youth participation in *Mosquitoes & Me* programming
- Specific Aim #2 – Enhancing Science Teaching of Elementary Science Educators**
Achieved through teachers learning and employing Ambitious Science Teaching (AST) and Diverse Pedagogy Theory (DPT)
- Specific Aim #3 – Enhancing Mosquito-Related Community Public Health**
Achieved through community residents gaining accurate understanding about controlling mosquito populations to improve public health.

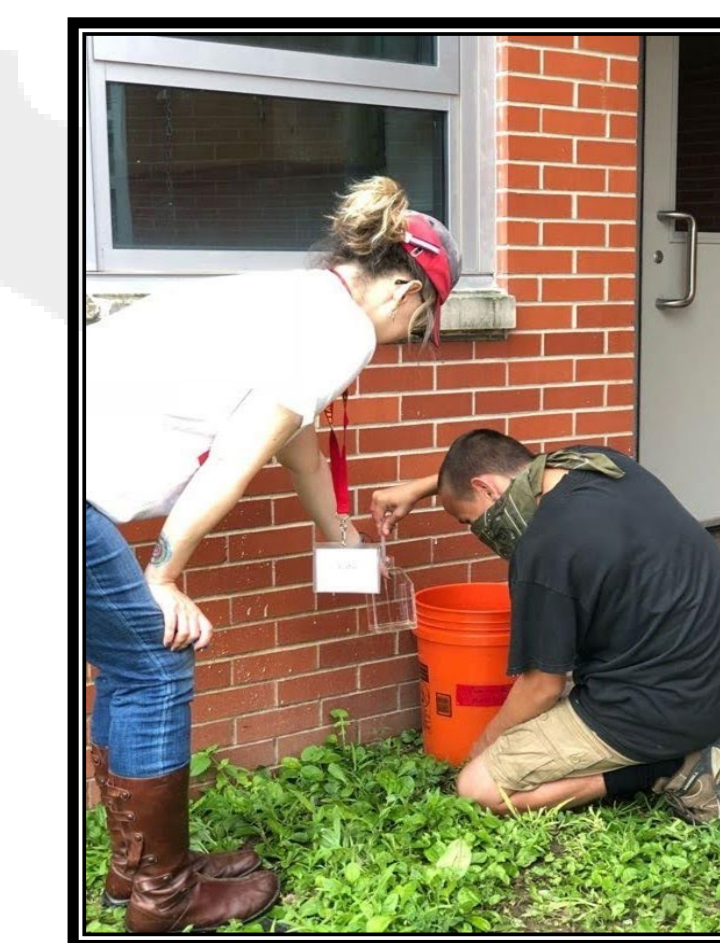
Camp Context

- The students served by this program attend schools served by a **university-school partnership called the ISU 4U Promise**. Through this partnership, students are eligible for tuition awards in support of their future undergraduate studies.
- This two-week summer camp builds on young learners' innate curiosity about the natural world. With its particular insect focus, *Mosquitoes & Me* aims to nurture students' capacity to ask and answer big questions and support this skill as an important part of their college-going journey.
- Mosquitoes & Me* participants learn authentic science practices while applying ideas about mosquito ecology to their local environment.
- This unique program uses an **ambitious and culturally-responsive approach to science education** that emphasizes student-centered intellectual engagement and creative thinking.

Participants

- Youth:**
- Entering grades 5-6 at King and Moulton Elementary Schools, Des Moines, Iowa
 - Race and Ethnicity: 63% Female, 43% Hispanic/Latino, 37% African American
- Near-Peer, Youth Mentors:**
- Returning youth with 1-2 years previous camp experience
 - Entering grades 6-9; 40% of camp participants

- Camp Educators:**
- Preservice teachers: ISU undergraduates, majoring in Elementary Education enrolled in a special "Teaching and Learning with Insects" course.
 - Inservice teachers: Recruited from the partner ISU 4U Promise schools and participating in our Professional Learning Community.



Key Evaluation Data

Key Findings at the Three-Year Point

Participation in the summer camp positively impacts ...

...youth's science skills	For example: "I can use my understanding of science to ask a question." "I can use the results of my investigation to answer the questions that I asked."
... youth's science attitudes	For example: "It is important to me to understand the work I do in science." "I would like a job that uses science."
...youth's mosquito science knowledge	For example: At the end of camp, the majority of youth report being "Skeeter Scientists" (as opposed to "Still Learners" when it comes to: basic mosquito anatomy, life cycle changes, male and female identification, biting behavior, disease transmission, breeding habitats, and preventative measures.
...youth's talking about mosquitoes at home	For example: At the end of camp, the majority of youth report sharing what they learned at summer camp with other people in their home.
... elementary educators' confidence in science teaching	For example: "I used to think it was the teacher spewing information, it is the group coming together and learning from one another...using real life situations. Students have so much more to offer."
...elementary educators' commitment to equity	For example: "The whole opportunity has change my career path. Before I didn't know I would be interested in social justice...This is life affirming. This is what I want to dedicate my life to."
... families' conversations about mosquitoes	For example: "Family members of youth participants discussed mosquitoes with others in the community, including the life cycles, what attracts mosquitoes, and disease."
... families' interest in the science education of their children	For example: "Now she wants to know more than 'What.' She wants to know 'how.'" "It is high level science that exposes them to thinking like scientists and puts them ahead when they get to high school."

Data Sources	Project Participants			
	Youth	Preservice Teachers	Inservice Teachers	Families
Pre and Post Surveys	x	x	x	
Mosquito Drawings	x	x		
Public Health Surveys				x
Individual Interviews	x	x	x	
Focus Group Interviews		x	x	
"I Can" Self Reports	x			
Science Notebooks	x			
Lesson Plans		x	x	
Smart Pen Drawings	x			
Video-taped Observation	x	x		

Summer Camp Overview

	Monday, June 18	Tuesday, June 19	Wednesday, June 20	Thursday, June 21	Friday, June 22
8:15 AM	Arrival & Bus Pick-Up				
8:45 AM	Breakfast				
9:00 AM	Why is it great that you are here?	Greetings & Recognitions	How do mosquito environments change over time?	How do mosquitoes grow?	Greetings & Recognitions
9:30 AM	Camp Orientation	What does it mean to do mosquito science?	Why are mosquitoes important?	Living History Farms	What is so important about water?
10:00 AM	Can we live together? Mosquitoes or humans?	Park Trip	Lunch		
11:30 AM	Lunchtime Activities				
12:00 PM	Where do mosquitoes live in our environment?	What do mosquitoes eat?	Pool Trip	Mosquito Ecosystem Model-Making	Where do mosquitoes live in our environment?
12:30 PM	Snacks & Team Check-ins				
2:30 PM	Dismissal & Bus Drop-Off				

	Monday, June 25	Tuesday, June 26	Wednesday, June 27	Thursday, June 28	Friday, June 29
8:15 AM	Arrival & Bus Pick-Up				
8:45 AM	Breakfast				
9:00 AM	Greetings & Recognitions				
9:30 AM	Where do mosquitoes live with us?	How do mosquitoes buzz?	Mosquito Inquiry Stations	How would you build a better mosquito trap?	Mosquito Trap Pickup/Redesign
10:00 AM	How do mosquitoes bite?	How would you trap a mosquito?	Lunch		Do all mosquitoes look the same?
11:30 AM	Lunchtime Activities				
12:00 PM	How do mosquitoes spread disease?	Mosquito Trap Design	Pool Trip	Mosquito Trap Setting	Pool Trip
12:30 PM	Snacks & Team Check-ins				
2:30 PM	Dismissal & Bus Drop-Off				

Curriculum Excerpt

Chapter 1: Mosquitoes & Biology

Page 2: Larval Nutrition

What are the details of this page's lesson?

Objectives: Students will collect and analyze data on the growth of their mosquito larvae. Students will create a graph to represent their collected data.

Materials: Large Push It Note paper (4) Mosquito Larvae Dry waste board Dry arena material

Preparation: Gather all necessary materials and divide them into groups for each team.

Students (per team): Theoretical mosquito larvae (2) Second-order mosquito larvae (2) Larvae food items (see list below): Yeast, yeast, dog food, locusts, cereal, leaves, potting soil, etc. Microscope Petri dish Pipettes (2) Measuring utensils (1/2 tsp, 1 tsp) Monitor & Petrie

Resources: Larval instar stages diagram (Appendix A) Video of larva eating (USE)

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We use an integrated Ambitious Science Teaching (Windschitl et al, 2018) and Diversity Pedagogy Theory (Rosa Hernandez Sheets, 2005) for our lesson plan framework.

Chapter 1: Mosquitoes & Biology

Page 2: Larval Nutrition

Lesson Plan Explain (3 revised)

Step 1: The group has been divided into teams and the teacher has distributed the materials and the students have been given time to set up their stations. The teacher has been observing the students as they work on their stations.

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