

Cal Poly Pomona, College of Agriculture

San Gabriel Valley Mosquito & Vector Control District's "Operation Mosquito G.R.I.D." Syllabus

Course title: Teacher Training: Middle School Citizen Science
Mosquito Surveillance Project

Meeting Times

Format and Length of course:

Hybrid: Day 1 of training takes place via Zoom. Day 2 is hands-on, in the lab. Participants will then implement the training materials in their own classrooms and submit evidence before November 30, 2022.

Days and Times of Onground or Synchronous Online Class Meetings *(if applicable):*

(Virtual, synchronous) Wednesday, July 20, 2022, from 10am – 3pm

(In-person, synchronous) Thursday, July 21, 2022, from 9am – 4pm

Contact Information

Instructor Name: Carol Anne Hagele

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Phone: (626) 214-0725

Office Hours: Monday – Thursday, 7:00 AM – 7:30 AM, 4:00 – 4:30 PM

Instructor Name: Kriztian Luna Corona

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Phone: (626) 422-0017

Office Hours: Monday – Thursday from 3pm – 4pm

Description

This course provides middle school science teachers with the skills and knowledge to guide their students through a scientific investigation using structured inquiry to determine the presence or absence of invasive *Aedes* mosquitoes around students' homes. Teachers will implement Operation Mosquito G.R.I.D. (Growth Reduction, Increased Detection) citizen science program in their classrooms and share student results with the San Gabriel Valley Mosquito and Vector Control District (SGVMVCD) and the public by November 30th. In doing so, middle school students can contribute real-world data and address a significant public health threat in their communities. This course will cover mosquito biology, mosquito species of public health significance in southern California, climate change and the impact on invasive mosquito vectors, the implications for vector-borne disease distribution, and the impact of invasive *Aedes* on human behavior. Operation Mosquito G.R.I.D. employs effective and ecologically sensitive habitat modification to control mosquito populations in neighborhoods through civic engagement. Science standards addressed include Grade 6 MS-LS1.B, Grade 7 MS-LS2.A, Grade 8 MS-LS4.B and 4.C. An optional student activity addresses Common Core Standards RST.6-8.1-9 as students present their findings to our agency in scientific journal format. Our agency will feature the winning entry in our EcoHealth blog and on our social media.

Social Justice Statement

We commit to fostering an inclusive classroom environment that honors diversity and creates a safe space for all students. If for any reason you feel uncomfortable because of an interaction with other students, or between you and the instructor, please privately reach out to the instructor or to the Office of Equity and Compliance. Contact our office at (909) 869-4646; officeofequity@cpp.edu or complete an incident report using this link: https://cm.maxient.com/reportingform.php?CalPolyPomona&layout_id=8

We value all individuals and consider diverse perspectives as resources, which benefit learning and discourse. We aim to center diversity and culture in classes and to present material that is inclusive and actively disrupts our assumptions. We aim to represent diversity of race, gender, sexuality, age, socioeconomic status, ethnicity, culture, and physical and learning abilities.

We strive to make this classroom an inclusive and equitable learning environment for all students. We encourage and appreciate your partnership and critical perspectives.

Our instructional team affirms our commitment to these principals. We encourage students to adopt these guidelines, as well.

- Assume positive intent.
- Communicate intentionally
- Resist assumptions
- Reflect on your own positionality and understand how you impact others
- Respect inter-relational differences
- Commit to understanding each individual
- Respect the dignity and essential work of all individuals

- Respect the privacy, property, and freedom of others
- Reject bigotry, discrimination, violence, or intimidation of any kind
- Practice personal and academic integrity and expect it of others
- Promote the diversity of opinions, ideas, and backgrounds, which is the lifeblood of the university.

Objectives

During this course, students will:

1. Learn about mosquito biology, surveillance strategies, mosquito source reduction, and bite prevention strategies.
2. Understand the link between mosquitoes, vector-borne disease, and climate change.
3. Learn about the benefits of a citizen science program and its role in civic engagement.
4. Learn to facilitate a citizen science mosquito surveillance program with their middle school students
5. Develop a lesson plan for implementation of Operation Mosquito G.R.I.D.
6. Support their middle school students in formulating a hypothesis, researching, and formulating assumptions, methods, and results for a specific scientific investigation
7. Support their middle school students with reporting surveillance results to the San Gabriel Valley Mosquito and Vector Control Agency

Outcomes

By the end of this course, students should be able to:

1. Explain and describe the impact that the arrival of invasive *Aedes* mosquitoes had on public health and the behavior of residents in southern California due to the differences in *Aedes* biology and behavior.
2. List pathogens transmitted by local mosquitoes
3. Properly employ the equipment and platforms needed to participate in G.R.I.D.
4. Guide a participant through each step of the G.R.I.D. checklist and related pages on the VectorEducation.org website with 100% accuracy
5. Guide middle school students through the process of sharing their data with our agency and the public to fulfill the purpose of this community science project.

Standards/Competencies

Related Disciplinary Core Idea (DCIs)

- Grade 6 MS-LS1.B growth and development of organisms
- Grade 7 MS-LS2.A interdependent relationships in ecosystems
- Grade 8 MS-LS4.B and 4.C natural selection and adaptation

Related Cross-Cutting Concepts (CCCs)

- Structure and Function
- Cause and Effect

Science and Engineering Practices (SEPs)

- Asking questions and defining problems
- Planning and carrying out investigations

Please see **Appendix A** for examples of NGSS-aligned concepts related to the course.

Materials

Required books, readings, software, etc.:

- San Gabriel Valley Mosquito and Vector Control District. (2019) *Mosquitoes in our communities [Brochure]*. <https://www.sgvmosquito.org/mosquitoes-and-mosquito-borne-disease-booklet>
- *Operation Mosquito G.R.I.D.* (2021). *YouTube*. Retrieved April 4, 2022, from <https://youtu.be/Zv-v7Hd9Lfg>.
- Laptop or tablet (during hands-on lab)
- Smartphone (during hands-on lab)
- Note: Classroom microscopes are essential for participating in G.R.I.D.

Optional books, readings, software, etc.:

- San Gabriel Valley Mosquito and Vector Control District. (2021). *Journey of the Germ (PC version) [Video game]*. Robot Sea Monster.

Evaluation

Criteria

Assignment	Title	Description	Time Estimate
Assignment 1	Day 1: Attendance and Participation	Attend the virtual training and contribute to the collaborative social media post on vectors and vector-borne disease. REQUIRED	4 hours
Assignment 2	Online Discussion	Respond to the following questions using Padlet. 1. How vector-borne disease information could best be delivered to middle school students? 2. What is the role of civic engagement/community science in matters of environmental and public health?	20 minutes
Assignment 3	Enroll for Operation Mosquito G.R.I.D	Using the link, enroll as a teacher on SGVMVCD's VectorEducation.org website.	10 minutes
Assignment 4	Day 2: Aedes mosquitoes and Operation Mosquito G.R.I.D. program facilitation	During our hands-on training, actively participate in identifying the stages of the mosquito life cycle, searching for stagnant water, setting oviposition lures, and analyzing oviposition papers. Demonstrate the proper use of water collection kit items, oviposition paper, oviposition cup, and submit photos onto the Padlet platform. Demonstrate the ability to facilitate the program independently. REQUIRED	6 hours
Assignment 5	Instructional Plan	Create a lesson plan outline to teach the context of Operation Mosquito G.R.I.D. and project facilitation. Include a link to the resources (videos, photos, etc.) that you are planning to use with students.	2 hours
Assignment 6	Student Enrollment for Operation Mosquito G.R.I.D	Using the link, facilitate middle school student enrollment on SGVMVCD's VectorEducation.org website.	2.5 hours
Assignment 7	Water Sample Submission	Provide middle school students with G.R.I.D. Kits and instruct them to collect a water sample from their property no later than November 11, 2022. Contact your facilitator or call SGVMVCD (626)814-9466 to have student samples collected from your school campus 1 day after samples have been returned. <i>(Note: if water is not returned promptly, organisms in the water will mold and become unidentifiable).</i>	2 hours

<p>Assignment 8</p>	<p>Post Student Photos of Data on Padlet</p>	<p>Using the Padlet link provided to you, guide your middle school students to analyze oviposition papers and post photos of the eggs found on their oviposition papers onto Padlet. Each middle school student should use their unique agent number when posting photos. By posting on Padlet, the data collected is available to SGVMVCD and the public.</p>	<p>5.6 hours</p>
<p>Assignment 9</p>	<p>Reflection and Post-assessment</p>	<p>Complete the "Operation Mosquito G.R.I.D. Teacher Reflection and Post-assessment" using the link provided.</p>	<p>1 hour</p>

Assignment Grading

Assignment	Max Points	Due Date
A1: Day 1 Attendance and Participation - required for completion.	15	Wednesday, July 20, 2022 by 11:59 pm
A2: Online Discussion	5	Wednesday, July 20, 2022 by 11:59 pm
A3: Enroll for Operation Mosquito G.R.I.D	5	Wednesday, July 20, 2022 by 11:59 pm
A4: Day 2: <i>Aedes</i> mosquitoes and Operation Mosquito G.R.I.D. program facilitation. Attendance and participation – required for completion	15	Thursday, July 21, 2022 in class
A5: Instructional Plan	10	Sunday, August 7, 2022 by 11:59 pm
A6: Student Enrollment for Operation Mosquito G.R.I.D	10	No later than Monday, September 12, 2022 by 11:59 pm
A7: Water Sample Submission	10	No later than Wednesday, November 11, 2022 by 11:59 pm
A8: Post Student Photos of Data on Padlet	20	No later than Wednesday, November 30, 2022 by 11:59 pm
A9: Reflection and Post-assessment	10	No later than Wednesday, November 30, 2022 by 11:59 pm
Totals	100	

Breakdown

Letter Grade (or Pass/Fail)	Percentage Range	Points
Pass	70 - 100	70 - 100
Fail	0 - 69.9	0 – 69.9

Course Details

When	Topic and objective or standard to be addressed	Notes
<p>Week 1: Day 1 (in person)</p>	<p>TOPIC: Vectors and Public Health</p> <p>Objectives for this day: Learn about mosquito biology, surveillance strategies, mosquito source reduction, and bite prevention strategies.</p> <ul style="list-style-type: none"> ● Understand the link between mosquitoes, vector-borne disease, and climate change. 	<p>Lesson Topics:</p> <ul style="list-style-type: none"> ● Importance of vector control to public health ● Connection between climate change and vector-borne disease ● Vector-borne disease cycles in the San Gabriel Valley ● Emerging diseases and vector/pathogens of concern <p>Read/Watch:</p> <ul style="list-style-type: none"> ● Students will explain the importance of the presence of <i>Aedes</i> in relation to public health ● Students will describe the environmental factors that attract <i>Aedes</i> mosquitoes to a property ● Pre-reading: San Gabriel Valley Mosquito and Vector Control District. (2019) <i>Mosquitoes in our communities [Brochure]</i>. https://www.sgvmosquito.org/mosquitoes-and-mosquito-borne-disease-booklet <p>Activities:</p> <ul style="list-style-type: none"> ● “Is it an egg?” Pre-assessment ● PowerPoint lectures and demonstrations from Operations and Surveillance staff members and guest speakers ● Interactive quizzes ● Interactive group activity ● Group creation of a social media post ● Assignment 1: Day 1 Attendance and Participation ● Assignment 2: Online Discussion ● Assignment 3: Enroll for Operation Mosquito G.R.I.D <p>Discussions:</p> <ol style="list-style-type: none"> 1. What is one way vector-borne disease information could be delivered to middle school students? 2. What is the role of civic engagement/community science in matters of environmental and public health?

<p>Week 1: Day 2 (in person)</p>	<p>TOPIC: Aedes Knowledge and Skills Practice</p> <p>Objectives for this day:</p> <ul style="list-style-type: none"> ● Learn about the benefits of a citizen science program and its role in civic engagement. ● Learn to facilitate a citizen science mosquito surveillance program with their middle school students 	<p>Lesson Topics:</p> <ul style="list-style-type: none"> ● Operation Mosquito G.R.I.D. Overview ● Aedes 101, Source Reduction, Bite Prevention ● Science behind G.R.I.D. techniques ● Sample collection and analysis ● Preparing for Facilitation <p>Read/Watch:</p> <ul style="list-style-type: none"> ● Identify the <i>Aedes</i> mosquito life stages with 100% accuracy ● Identify <i>Aedes</i> mosquito eggs with 95% accuracy ● Properly set a detection lure ● Guide a participant through each step of the G.R.I.D. checklist and related pages on the VectorEducation.org website with 100% accuracy ● Post an oviposition paper image on Padlet ● <i>Operation Mosquito G.R.I.D. (2021). YouTube.</i> Retrieved April 4, 2022, from https://youtu.be/Zv-v7Hd9Lfg. <p>Activities:</p> <ul style="list-style-type: none"> ● “Can you ID me?” Activity ● Inspect photo of a yard ● Stagnant water hunt and collection ● Lure preparation ● Oviposition paper analysis ● “Is it an egg” post-assessment ● Resource review ● Assignment 4: <i>Aedes</i> mosquitoes and Operation Mosquito G.R.I.D. program facilitation <p>Discussions:</p> <ul style="list-style-type: none"> ● Skills practice and feedback ● Discuss how to guide students in formulating a hypothesis, researching, and formulating assumptions, methods, and results for a specific scientific investigation ● Implementation planning
<p>Week 2 - 3</p>	<p>TOPIC: Instructional Plan (Asynchronous)</p> <p>Objectives for this week:</p> <ul style="list-style-type: none"> ● Develop a lesson plan for implementation of Operation Mosquito G.R.I.D. 	<p>Lesson Topics:</p> <ul style="list-style-type: none"> ● Develop an instructional plan <p>Read/Watch:</p> <ul style="list-style-type: none"> ● Review materials and activities from the training <p>Activities:</p> <ul style="list-style-type: none"> ● Assignment 5: Instructional Plan <p>Discussions:</p> <ul style="list-style-type: none"> ● Comment on peer’s instructional plans and provide suggestions

<p>Week 4 – 20</p>	<p>TOPIC: G.R.I.D. Implementation with middle school students (Asynchronous)</p> <p>Objectives for these weeks:</p> <ul style="list-style-type: none"> ● Support their middle school students in formulating a hypothesis, researching, and formulating assumptions, methods, and results for a specific scientific investigation ● Support their middle school students with reporting surveillance results to the San Gabriel Valley Mosquito and Vector Control Agency 	<p>Lesson Topics:</p> <ul style="list-style-type: none"> ● Implementation of program with middle school students <p>Read/Watch:</p> <ul style="list-style-type: none"> ● Guide middle school students through each step of the G.R.I.D. checklist and related pages on the VectorEducation.org website ● Facilitate middle school student postings of results on Padlet ● Use selected resource materials from training <p>Activities:</p> <ul style="list-style-type: none"> ● Implement program with middle school students ● Assignment 6: Student Enrollment for Operation Mosquito G.R.I.D. ● Assignment 7: Water Sample Submission ● Assignment 8: Post Photos of Data on Padlet ● Assignment 9: Post-assessment <p>Discussions:</p> <ul style="list-style-type: none"> ● Troubleshoot with middle school students ● Discuss formulating a hypothesis, researching, and formulating assumptions, methods, and results for a specific scientific investigation with students
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Course Policies

Referencing Work

Students are expected to reference all work that is not their own, according to APA standards. This includes all print, visual and video material, such as journal articles, magazines, YouTube videos, downloaded photos, quotes, and content that you summarized from someone else's ideas. Owl.purdue.edu has a useful set of guidelines that includes electronic sources.

If SGVMVCD staff present or publishes work related to Operation Mosquito G.R.I.D., teachers be named as collaborators. Students will remain anonymous, but schools will be acknowledged.

Instructor Communication and Feedback on Assignments

Student inquiries can be submitted via the email addresses provided in the "Contacts" section of this syllabus. *The instructor will reply to inquiries within 48 hours and will grade all assignments within seven days of the due dates.*

Technology

Each student must:

1. Own or have ample access to a computer (at home or at work)
2. Have general knowledge of the operation of and care for a computer, computer hardware/software, and be able to implement some basic troubleshooting techniques (check connections, restart the computer, etc.)

3. Must have a valid email address.
4. Have a basic understanding of how to use the internet.
5. Access to microscopes on middle school campus

Evaluation Requirements

1. Grades are based on evaluation of course competencies, to be reviewed in class and by the quality of completed course assignments as defined in this syllabus.
2. Personal time management is a critical skill for success as a student and as a professional. Timely completion of work and discussion participation will bear strongly on evaluation of your professionalism.
3. Students are expected to prepare ahead of activities and discussions. Operationally defined, preparation includes having required reading assignments read, and written work completed when due so that you can discuss, relate and apply the information. If you have questions that arise during your preparation, contact the instructor.
4. Due dates for all assignments are final unless prior arrangements have been made. Late assignments will not be accepted.
5. All formal written work must be word processed and carefully edited.

Institutional Policies and Additional Items

Student Conduct

Students are subject to disciplinary action for several types of misconduct or attempted misconduct, including but not limited to dishonesty, such as cheating, multiple submission, plagiarism, or knowingly furnishing false information to the University; or theft or misuse of the intellectual property of others or violation of others' copyrights. Students are encouraged to familiarize themselves with Cal Poly Pomona's Student Conduct & Integrity:

<https://www.cpp.edu/studentconduct/student-conduct-code.shtml#:~:text=Students%20are%20expected%20to%20be,to%20student%20and%20university%20life> .

Services for Students with Disabilities

In accordance with the Americans with Disabilities Act of 1990, Cal Poly Pomona provides appropriate accommodations and support services to qualified applicants and students with disabilities. These include, but are not limited to, auxiliary aids/services such as sign language interpreters, assistive listening devices for hearing-impaired individuals, extended time for and proctoring of exams, and registration assistance. Accommodations and types of support services vary and are specifically designed to meet the disability-related needs of each student based on current, verifiable medical documentation. Please visit Cal Poly Pomona Disability Resource Center page at <https://www.cpp.edu/drc/index.shtml> for more information.

Incompletes

Your instructor may post the interim grade Incomplete/I if at the end of the class your overall work is of passing quality, but a portion could not be submitted for understandable reasons (e.g. illness). It is your responsibility to petition your instructor for permission to submit work late and

to provide an explanation, and it is his or her sole decision whether to accept the explanation. If permitted, the Incomplete/I grade will be posted and a time frame defined for you to submit the missing work, ranging from one to twelve weeks. Incomplete/I grades that remain unchanged after twelve weeks will lapse to F, NP or U. Receiving an I grade entitles you to submit only the missing work your instructor has agreed to accept late, and does not allow other work to be retaken or oblige Cal Poly Pomona to provide continuing access to course materials. Please visit Cal Poly Pomona Registrar's Office (Grades) for details:
<https://www.cpp.edu/registrar/student-record/grades.shtml>

Sexual Harassment

Cal Poly Pomona is committed to creating and maintaining a community where all individuals who participate in University programs and activities can work and learn together in an atmosphere free of harassment, exploitation, or intimidation. Every member of the community should be aware that the University prohibits sexual harassment and sexual violence, and that such behavior violates both law and University policy. The University will respond promptly and effectively to reports of sexual harassment and sexual violence, and will take appropriate action to prevent, to correct, and when necessary, to discipline behavior that violates our policy.

All students and instructors who believe they have been sexually harassed are encouraged to file an incident report with Cal Poly Pomona Office of Equity and Compliance. Visit <https://www.cpp.edu/officeofequity/index.shtml> for details.

Nondiscrimination Statement

Cal Poly Pomona, in accordance with applicable federal and state laws and University policies, does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy, physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services. The University also prohibits sexual harassment. This nondiscrimination policy covers admission, access, and treatment in university programs and activities.

Inquiries regarding the University's nondiscrimination policies and reports of violations by contacting our office at (909) 869-4646; officeofequity@cpp.edu. Your report will be accepted in any language. Please visit <https://www.cpp.edu/officeofequity/discrimination-harassment-retaliation/report-an-incident.shtml> to report an incident on our online portal.

Appendix A

Examples of Operation Mosquito G.R.I.D. N.G.S.S. alignment by grade.

Grade	Main Activity	SEP	DCI	CCC
6	Students develop questions about the number of <i>Aedes</i> eggs laid per container and the advantage of this mosquito's strategy	Asking questions and defining problems	MS-LS1.B growth and development of organisms	Structure and function
7	Students examine their properties and determine the number of water sources available for mosquitoes to grow and predict presence and density of <i>Aedes</i>	Planning and carrying out investigations	MS-LS2.A interdependent relationships in ecosystems	Cause and effect
8	Students develop questions regarding the adaptation of <i>Aedes</i> mosquitoes to container breeding and the use of sensory structures to identify ideal containers.	Asking questions and defining problems	MS-LS4.B and 4.C natural selection and adaptation	Structure and function

Further CCCs and SEPs and related topics are available in our teacher resources library.