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Lighting a Pathway to Energy Transitions: Collecting, Interpreting and Sharing Engineering Designs and Research Data Across a School-based Agrivoltaics Citizen Science Network (Pre-College Resource/Curriculum Exchange)

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Lighting a Pathway to Energy Transitions: Collecting, interpreting and sharing engineering designs and research data across a school-based agrivoltaics citizen science network

(Resource Exchange)

Grade level: 1-12   Time: School year integration   Standards Focus: NGSS 3-5 ETS

The Sonoran Photovoltaics Laboratory (SPV Lab) is a network of K-12 students and teachers, scientists, engineers, and community partners encouraging equitable, lasting, sustainable energy transitions. Specifically, SPV Lab is developing an innovative model for school-based citizen science that supports a networked approach to building knowledge in *agrivoltaics*, a new area of engineering research that couples solar energy generation and food production. Solar panels are raised above agricultural crops, creating a symbiotic relationship between the photovoltaic panels and the plants that are located underneath. A cooling microbiome is generated beneath the solar panels that reduces the temperature in the area, thereby providing a more hospitable home for plants while increasing panel efficiency, collecting energy that can be used to run irrigation systems, charge batteries, laptops, and other devices, or run school-related devices.

SPV Lab is creating a citizen science network that supports and sustains student and community learning in the area of sustainable food and energy, thereby educating the next generation of energy researchers and knowledgeable citizens. Students and teachers at each K-12 school campus research site design, build and install agriPV garden spaces, including mobile PV racking systems to hold panels at effective angles over garden beds. Each site includes at least one experimental and one control garden bed that are planted, tended, and monitored by youth citizen scientists.

SPV Lab teachers and facilitators co-create resources, practices, and protocols that support SPV Lab students to (a) conduct community ethnography to inform crop choices, (b) collect data in the garden using simple digital tools and time series monitoring devices, (c) analyze and interpret data from experimental and control garden beds, and (d) share data and lab reports across multiple campuses. These activities promote the significance of engineering sustainable energy solutions, as well as local food systems and healthy community relationships.
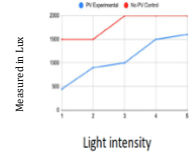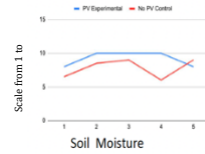
Students and teachers across campuses interact through sharing of agrivoltaics data and lab reports using an online platform to facilitate collaboration at a distance. Students not only learn, but also generate new scientific knowledge while contributing social value to their communities through clean energy and food production. A collection of resources can be found here:

https://drive.google.com/drive/folders/1iXq3suchVqPJtQs_RXRBWwfDODC1pBqS?usp=sharing

K-12 Teachers who contributed to the development of these resources: Janet Ankrum, Mia DeLaRosa, Melissa Calderon, Cheryl Carswell, Andrew Centanni, Melany Coates, Tianna Griffin, Brianne Loya, Anais Mejia, Peter Monzo, Maria Elena Peterson, Jessica Pitts, Mayra Ramos, Jason Reschke, Kathy Ruiz, Angela Striggles, Steven Smigielski, Nikki Tapia

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