

## University of California Santa Cruz

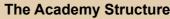
# SCWIBLES Santa Cruz-Watsonville Inquiry-Based Learning in Environmental Sciences

http://scwibles.ucsc.edu

### **Program Goals**

The SCWIBLES GK-12 program at the University of California. Santa Cruz (UCSC) aims to increase diversity in the environmental sciences by increasing the academic success and career opportunities for students in the Environmental Science and Natural Resources (ESNR) Academy at Watsonville High School.

Watsonville High School is located in an agricultural community in California's central coast that primarily serves low-income Latino students, a third of whom are learning English as a second language.



Watsonville High School has an innovative educational structure, where each student spends three years in one of seven small-learning communities, or Academies. These schools-within-the-school provide career-focused pathways centered around project-based learning.

The ESNR Academy guides students to postsecondary education and jobs in the relevant fields of agriculture, environmental management. and green technology.



### Summer Research Fellowship Program

#### Training in Inquiry-Based Pedagogy

During the summer, Graduate Fellows and Teacher Partners share areas of expertise, build collaboration through hands-on science, and develop exciting and effective inquiry-based curriculum.



A summer workshop kicks off this research experience with an intensive introduction to field-based inquiry projects. The projects, led by UC Santa Cruz faculty, are based on the

Organization for Tropical Studies field problems model, and are conducted in the UCSC Natural Reserve, labs, and greenhouses.

#### **Teachers as Practicing Scientists**

Teachers then apprentice to GK-12 Graduate Fellows who are working on their dissertation research for hands-on research experience.

This year, Teacher Dan Johnston joined Fellow Jorge Torres in his native Costa Rica to study how management practices affect the regeneration of secondary growth forests on private lands.

They used transects to identify species composition, and field experiments to evaluate the impact of management practices on seedling regeneration.



## Fellows' Research Into the Classroom—And Beyond

#### Nina Arnberg PhD Candidate in Ecology & Evolutionary Biology

I study the behavioral ecology of Golden-Crowned Sparrows on the California Central Coast



Evolutionary theory suggests that individuals that form flocks may be kin. In partnership with the WATCH (Watsonville Area Teens Conserving Habitats) program of the Monterev Bay Aquarium, I am working with 10th-12th graders from the Marine Biology class, guiding students in a vear-long study of bird behavior at the Elkhorn Slough National Estuarine Researc

Students go through a complete scientific investigation of their own design, from initial observations, to experimenta design, and then presentation of their findings. Each semester, students spend six 3-h days collecting data in the field.

#### Elizabeth Bastiaans PhD Candidate in Ecology & Evolutionary Biology

Reserve

I study variation in sexually selected traits (like throat color) of a lizard that lives in Mexico.



sexually selected traits contribute to

lead to the formation of new species

divergence between populations that can

Using Wisconsin East Plants™, which have been artificially selected for maintained within and among populations Ultimately I want to know whether the mechanisms that maintain variation in pedigree for their plants, calculate



classroom use, students choose a trait to analyze (like height), and grow two generations of plants during a single semester. Students learn to make a heritability for the trait they chose, and manipulate an environmental variable to observe its effects on the same trait.



The Ohlone tiger beetle is an endangered species and endemic to Santa Cruz County. My research aims to determine what factors-habitat guality or habitat size and isolation-affect the beetle population in its remaining habitats.



I also investigate the effects of human activity on the beetle's status as well as potential management techniques to augment the beetle's populations. I aim to bridge science and conservation management

In a 10th and 11th grade Natural Resources class. I led a water quality module that examined how human activities can negatively affect water quality and, in turn, human & environmental health



The students learned how human construction activities increase runoff causing erosion, pollution, eutrophication, and habitat and water contamination. Students gained skills creating and applying a solution to a real world problem.

#### Jennie Liss Ohayon PhD Student in Environmental Studies

I research ecological and social aspects of the strategies used to restore native plant communities in Superfund sites following environmental remediation

I use experimental and comparative studies to understand how to create initial native vegetation that is self-sustaining

participate in scientific decisionmaking about the restoration process

SCWIBLES has been a great opportunity for me to expand and diversify public involvement in science

I work with 10th-12th graders in Natural Resources and Green Careers on local solutions to energy sustainability.

Students conduct an energy audit of their high school and create biodiesel from

vegetable oil. Students learn the chemical reactions for making biodiesel and test which vegetable oils produce high quality fue



Using a processor for making large quantities of biodiesel from waste oil, students gain experience in managing a complex, long-term project. They also learn how to raise community awareness about environmental issues through interactions with the popular press.





