Citizen Science Provides Context for K-12 Science Investigations “Insights from the Cornell Lab of Ornithology's BirdSleuth Program

Jennifer Fee, Cornell Lab of Ornithology

While teachers often find it challenging to take the plunge into open-ended student science investigations, we’ve seen that citizen-science observations can provide needed context for the kinds of scientific questions that form the basis for meaningful investigations. Over the past 10 years, we have developed and tested curriculum resources and online courses aimed at helping teachers guide students in asking scientific questions, crafting and testing hypotheses, collecting and organizing data, drawing conclusions, and sharing their work… building the science process skills specified in the NGSS standards. The newest iteration of these materials is designed to support teachers and their students as they participate in any citizen-science project as a jumping-off point into inquiry. I will share how these curricular supports and professional development opportunities can support teachers who participate in citizen-science projects as they endeavor to meet standards in deeply engaging, real-world ways.

Curating and Co-creating Citizen Science Lesson Plans -- Insights from North Carolina State University's Students Discover Project

Leonora Shell, StudentsDiscover.org - Your Wild Life - North Carolina State University

The past three summers we have partnered scientists with middle school teachers so they can co-create citizen science projects and lesson plans. Our scientists bring a research question and protocols; our educators bring their expertise in what will work in a classroom, available materials, time and safety constraints. Those experts then work together to create a plan for what will work to both answer research questions using citizen science and produce national standards-aligned lesson plans for students. The lessons are compiled into a visual format by a team of an artist, a digital curator and a web designer and offered for free on StudentsDiscover.org. Our primary goal is to scale our projects from one scientist talking to one teacher, to educators around the world from many levels downloading, using and participating in more citizen science projects. The scientists gain data, and the students learn through their involvement in real science.

Curriculum, Professional Development, and Citizen Science Woven Together to Support Teachers and Students - Insights from the Gulf of Maine Research Institute's Vital Signs program

Christine Voyer, Gulf of Maine Research Institute

The Gulf of Maine Research Institute’s citizen science program Vital Signs was designed in collaboration with teachers and scientists to meet the needs of each. From protocols to skill building lesson plans to purpose-built technology platform to structured investigations, Vital Signs supports students and teachers in successful participation in scientific research. These tools are complemented by teacher professional development workshops that have been shown to increases teachers’ comfort with supporting students in designing investigations, asking questions, and collecting quality data. Teachers also gain comfort with skills and concepts related to data and statistics. Their students are now asking their own questions, reasoning with evidence, engaging in scientific argument, working with data, conducting peer review, and taking action in their communities. We will share lessons learned from iterating and collaborating with teachers and scientists over the years to support rigorous citizen scientist data collection and rich learning outcomes.
Fostering Meaningful Dialogue in Student-Teacher-Scientist Research Partnerships - Insights from the University of Maryland Center for Environmental Science

Cat Stylinski, Appalachian Laboratory, University of Maryland Center for Environmental Science

To expand K-12 students’ participation in citizen science beyond the role of data collectors, we are applying a transferable approach that promotes and supports meaningful dialogue between scientists and regional teenagers and teachers. This approach centers on building partnerships with a focus on data interpretation and explanation of authentic science questions relevant to all partners. Our collaborative science-education team crafted a comprehensive curricular unit that provides scaffolding of key science concepts and practices with a mixture of exercises, readings, discussions and protocols. We prepare teachers through in-depth training that extends into the classroom and includes all necessary resources. Scientists interacted regularly with their K-12 partners throughout the multi-week investigation. This culminates in in-person “project team meetings” with scientists and now experienced students and teachers engaging in sophisticated discussions about findings, implications and future research.

Three Steps to Using Citizen Science as a Springboard for Classroom Investigations: Insights from the University of Minnesota’s Driven to Discover Program

Sarah Weaver, University of Minnesota

The experience of collecting citizen science data is the beginning point for the project, Driven to Discover: Citizen Science Inspires Classroom Investigation. Driven to Discover incorporates the process of science and critical content that teachers are expected to use in classrooms, addresses state and national standards, and provides a rigorous and engaging experience for students. We have developed a three-step process in which 1) students develop essential science skills and build foundational knowledge, 2) contribute to an existing, ecology-focused citizen science project, and 3) conduct their own independent investigations. Thus, citizen science projects provide the foundation for students to develop place-based ecology questions to pursue on their own school-grounds. The project includes a culminating event where students can present their investigation to university scientists. We will share our experience training teachers and observing implementation in schools for grades 5-12, and highlight publicly available teaching tools.