SciGirls

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Citizen SciGirls Transmedia and Research to Encourage Girls in STEM

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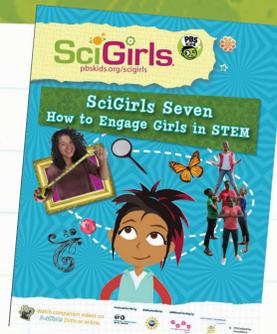
The SciGirls Seven: Strategies for Engaging Girls in STEM

The *SciGirls* approach - for the TV show, website, and educational materials - is rooted in research about how to engage girls in STEM. A quarter of a century of studies have converged to become a set of proven strategies forming the *SciGirls'* foundation. We call these strategies **The SciGirls Seven.**

The SciGirls Seven

1. Girls benefit from collaboration, especially when they can participate and communicate fairly.
2. Girls are motivated by projects they find personally relevant and meaningful.
3. Girls enjoy hands-on, open-ended projects and investigations.
4. Girls are motivated when they can approach projects in their own way, applying their creativity, unique talents, and preferred learning styles.
5. Girls' confidence and performance improves in response to specific, positive feedback on things they can control - such as effort, strategies and behaviors.
6. Girls gain confidence and trust in their own reasoning when encouraged to think critically.
7. Girls benefit from relationships with role models and mentors.

Citizen SciGirls Episode Partners

Nature's Notebook is part of the USA National Phenology Network. Participants gather information on plant and animal phenology across the U.S. to be used for decision making to ensure the continued vitality of our environment.

Celebrate Urban Birds is a year-round project developed and launched by the Cornell Lab of Ornithology. Its primary purpose is to reach diverse urban audiences who do not already participate in scientific investigation. Another goal is to collect high-quality data from participants that will provide the lab with valuable knowledge about birds in urban areas.

NASA's Student Cloud Observations Online Project (S'COOL) involves students in making and reporting observations of clouds to assist in the ground validation of NASA's CERES satellite instruments.

The Monarch Larva Monitoring Project (MLMP) enlists volunteers to collect long-term data on larval monarch populations and milkweed habitat. Developed by researchers at the University of Minnesota, the project aims to better understand how and why monarch populations vary in time and space, with a focus on monarch distribution and abundance during the breeding season in North America.

FrogWatch USA is a citizen science program that invites individuals and families to learn about the wetlands in their communities and help conserve amphibians by reporting the calls of local frogs and toads.

Zooniverse is a collection of web-based citizen science projects that use the efforts and abilities of volunteers to help researchers deal with the flood of data that confronts them. **Seafloor Explorer** is a Zooniverse project in which participants identify aquatic animals and ground cover in images of the seafloor to help create a library of seafloor life in the habitats along the northeast continental shelf.

Project Summary

SciGirls is the first national children's television series designed to engage millions of children in citizen science. *Citizen SciGirls* leverages NSF's multi-year investment in both *SciGirls* and citizen science to address the ongoing critical need to encourage more women to pursue STEM careers.

A New Kind of Television

SciGirls' half-hour, "reality-TV" style documentary format breaks the mold of traditional magazine-style television for kids. *SciGirls'* formative evaluations reveal that the half-hour narrative deeply engages our audience, as the girls on the show ask authentic questions, develop approaches to experiments, gather data, analyze data, then debate their findings and enjoy the reward of sharing their results. With this half-hour, full-inquiry format, we have established a new kind of science television where young scientists are guided by mentors through an authentic, detailed and rewarding STEM experience.

Citizen SciGirls Partners

Partner: Cornell Lab of Ornithology
The Cornell Lab of Ornithology Citizen Science Program currently conducts multiple large-scale citizen science projects designed for informal audiences: Project FeederWatch, NestWatch, Celebrate Urban Birds, eBird and the Great Backyard Bird Count. The Citizen Science Toolkit for Project Development (citizenscience.org) now numbers thousands of projects around the world.

Partner: National Girls Collaborative Project (NGCP)
SciGirls outreach efforts have been facilitated by our partnership with the NGCP, a critical gateway to local chapters of national organizations that support STEM for girls. NGCP has enormous reach. It facilitates collaboration between more than 12,800 organizations that serve more than 8 million girls and 4 million boys.

Research and Evaluation

The Cornell Lab of Ornithology Citizen Science Program will be validating the DEVISE: Developing, Validating, and Implementing Situated Evaluation Instruments for use with children. These are tools for evaluating the impacts of citizen science participation for educational outcomes as described in the NSF Framework for Evaluating Impacts of Informal Science Education (ISE) Projects which include: knowledge, interest, attitude, behavior, skills. The instruments will evaluate the motivation to do science, self-efficacy and the skills of science inquiry. Dr. Barbara Flagg of Multimedia Research has evaluated past *SciGirls* efforts and will build on that work to provide both formative and summative evaluation of *Citizen SciGirls*.

Citizen SciGirls Episodes

Nature's Notebook
Three girls in Minnesota record the arrival of spring blooms and buds, tracking the seasonal changes in plants.

FrogWatch USA
Four friends sign on as FrogWatch USA volunteers in St. Louis, venturing into local wetlands to help monitor the amphibian population by reporting the calls of frogs and toads.

Celebrate Urban Birds
Three girls in Denver use urban greening to help create better habitats for their local bird populations.

NASA's S'COOL Project
Three girls in Virginia work with NASA scientists and S'COOL to report observations of clouds to help ground validate NASA's CERES satellite instruments.

Monarch Larva Monitoring Project
In Minneapolis, three friends help track the population of monarchs by observing local caterpillars in their milkweed habitat.

Zooniverse | Seafloor Explorers
Girls in California visit a kelp forest to collect underwater digital images and launch a mission to conserve their local marine habitat.

SciGirls Games and Interactives (pbskids.org/scigirls)

Continuing our practice of transmedia innovation, *SciGirls* is going mobile, creating new features that connect television with the citizen science field experience. *SciGirls* Listology uses real-world activities to complement the online game. As part of month-long play sessions, users complete personalized "to do lists" of kid-friendly STEM activities as well as a citizen science "challenge," which introduces users to basic citizen science protocols and data collection. Playing Listology builds *SciGirls'* identity as science doers! In a second game, players make observations, gather data and earn experience points while learning inquiry and research protocols.

"Active Explorer" AAAS App for Outreach Quests

SciGirls is featuring the "Active Explorer" app in the Celebrating Urban Birds episode. The app, built by the American Association for the Advancement of Science (AAAS), contains a set of tools that allow youth to make observations and gather data in the field. Users organize their data in different ways and create and share colorful, personalized reports.