

# Environmental Education Outreach with Preschool to Middle School Age Children in the Phoenix Metropolitan Area



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## Introduction

Funded by the Central Arizona-Phoenix Long Term Ecological Research (CAP LTER) program, Ecology Explorers seeks to improve the scientific literacy of Arizona's citizens and to shape a better community by giving students, teachers, and community members the opportunity to study the ecology of our desert cities and the real-world issues they face. Ecology Explorers:

- Addresses gaps in science curriculum to produce lessons based in real urban ecology research performed by CAP LTER that follow state and national science standards
- Provides students with opportunities to study and engage with scientific research; teaches students to evaluate concepts through development of hypotheses, experimentation, data collection, analysis of results, etc.
- Provides teachers with lesson plans, slide sets, classroom outreach opportunities, professional development opportunities and other resources to help conduct urban ecology research in their schoolyard with their students
- Improves community awareness of sustainability issues relevant to the urban desert ecosystem

## Lessons

Ecology Explorers utilizes urban ecology research conducted by CAP LTER to develop and publish elementary and middle school level science lessons. These lessons:

- Follow the 5E Instructional Model of Learning to create an engaging, experiential learning experience for both students and teachers that allow students to build their own understanding of scientific concepts and skills
- Follow the Arizona Department of Education Science Standards, the Next Generation Science Standards, and the Common Core standards in order to make them applicable to curriculum important to state educators, as well as usable by educators across the nation

Through these lessons, students practice research and analytical skills, while learning about scientific concepts that impact the urban desert environment in which they live. Students collect data and submit it to the Ecology Explorers data center. They can find patterns within data collected in their communities and compare it to data collected across the Phoenix Metropolitan Area.



## Conclusions

Ecology Explorers focuses its educational efforts within the field of urban ecology. By utilizing the research performed by CAP LTER to create and implement environmental education programs for elementary and middle school age students, Ecology Explorers also addresses the environmental and social aspects of sustainability. The program desires to create environmental awareness and positive behavior change by educating the individuals who impact the earth. Particularly, the program focuses on children, who make up the future generation that will eventually be tasked with addressing the sustainability issues created and perpetuated by past and present generations. The program addresses environmental sustainability by teaching lessons on ecological concepts relevant to both the environment of central Arizona and the global environment. It addresses social sustainability by working directly with the social systems that affect and are affected by the environment, and by incorporating the concept of human-environmental relationships and impacts within the lessons. Members of this program work to increase ecological understanding across the state by performing education and outreach work at schools, after school programs, fairs, public events, etc.

## Outreach

Outreach generally targets students ranging from in age from preschool to middle school level in order to provide a wide variety of ecology and research-centered learning opportunities. Ecology Explorers performs three main types of outreach: classroom programs, after-school programs, and public event outreach.

### After-School Programs

- Conducted on a multi-day basis to provide scientific research opportunities to students in addition to those they might receive in the classroom
- Example: Homeward Bound
  - 4 week program at a transitional housing community in Phoenix
  - Provides lower income students with a strong academic foundation in science
  - Outreach efforts focused on student exploration of urban ecology at the housing campus where they live
  - Topics included urban microclimates, bird ecology, arthropod investigation, Blue Palo Verde seed pod investigation, etc.



### Classroom Programs

- Occur on a one time or multi-day basis to teach lessons relevant to the scientific interests of the teacher and of the community in which the school is located
- Example: Greening Wilson School
  - 6 week program with two 6th grade science classes
  - Focused on teaching microclimates and urban heat island to help students understand greening project occurring on their campus
  - Collaborative participation in Wilson Health Fair with Sonoran Institute and Helping Phoenix Neighborhoods to inform greater community of urban heat island issue and its negative health impacts
  - Follow-up program in 2015-2016 school year with mixed 6th/7th grade sustainability elective to teach evapotranspiration, animal thermoregulation, plants as a habitat, etc.



### Public Event Outreach

- One time events that target community interests and seek to improve scientific literacy by discussing urban ecology concepts relevant to Arizona
- Example: Urban Heat Island tabletop
  - Tabletop focused on introducing viewers to concept of urban heat island in a short interactive discussion with presenter
  - Used to engage community members at public events (ASU's Night of the Open Door, Walton Sustainability Solutions Festival, Arizona National Guard's Earth Day Event, etc.)



## Outcomes

Through lesson development, teacher professional development, and outreach work, Ecology Explorers:

- Introduces ecology concepts into the classroom using actual scientific research
- Provides students with opportunities to follow scientific protocols, collect data and perform experimentation
- Provides teachers with opportunities to expand research skills and increase breadth of scientific knowledge
- Provides undergraduate students of the School of Sustainability at Arizona State University opportunity to serve as educational outreach interns; students gain experience in both formal and informal environmental educational settings



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## For Further Information

More information on Ecology Explorers and related projects can be obtained by emailing [ecology.explorers@asu.edu](mailto:ecology.explorers@asu.edu) or by visiting [ecologyexplorers.asu.edu](http://ecologyexplorers.asu.edu). Information can also be found at [caplter.asu.edu](http://caplter.asu.edu) and [sustainability.asu.edu](http://sustainability.asu.edu).