

Global Drylands Center Annual Newsletter

Exciting Developments with GDC and Local K-12 STEM Education

Visit to Asombro Institute and Jornada Range

On September 19th and 20th, several of the Associates joined the Global Drylands Center (GDC) staff on a field trip to Las Cruces, New Mexico, to learn about the work being done by the Asombro Institute for Science Education and the USDA's Jornada Experimental Range. Dr. Osvaldo Sala, ASU Regents' Professor in the School of Life Sciences and Founding Director of GDC, and many of his colleagues have supported and participated with both organizations for many years.

Asombro is a non-profit whose mission is to increase science literacy by providing engaging, place-based education programs. The Jornada Experimental Range is owned by the Agricultural Research Service (USDA) and hosts a large number of research projects on long-term ecological and agricultural research. Jornada and Asombro work closely together. Asombro directs K-12 education and collaborates in the outreach programs different long-term ecological research projects. Jornada scientists often participate in Asombro programs and provide real experimental data to be incorporated into Asombro's materials. Asombro closely collaborates with New Mexico State University and other organizations including ASU.

On the afternoon of September 19th, we arrived at the Asombro headquarters located on the NMSU campus and met with key stakeholders: Dawn Browning, Research Ecologist at the Jornada Experimental Range; Caiti Steel, NMSU Assistant Professor associated with Jornada; and Stephanie Bestelmeyer, Executive Director of the Asombro Institute. They each shared with us their accomplishments which we found to be quite remarkable.

The Asombro approach is unique in that it teaches students science by doing science - conducting experiments, collecting data, analyzing results and presenting conclusions - like a real scientist would. Asombro education also focuses on local issues and ecosystems through collaboration with Jornada and other research institutions.



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Visit to Asombro, *Cont.*

The morning of September 20th we travelled to the Chihuahuan Desert Nature Park, approximately 15 miles north of Las Cruces. Owned and managed by Asombro, the 935-acre open space boasts a variety of features and is used for K-12 student field trips to complement the classroom material.

We walked on a portion of the 1.5-mile Desert Discovery Trail which led to a shaded 150-seat amphitheater

overlooking the park that is used for large-scale events. We also saw the Desert Experience Mini-Trail and the Science Demonstration plot, which is a restoration experiment where students collect and analyze data.

We concluded our tour at the Jornada Experimental Range where we viewed one of Dr. Sala's large-scale rainfall manipulation experiments and discussed the results of this research.

Although there are many non-profit organizations in Phoenix that offer K-12 STEM programs, including ASU, none has the unique characteristics of the Asombro approach.

Desert Data Jam

The Desert Data Jam is a program hosted by the Asombro Institute that challenges middle school students to find interesting ways to present scientific data to non-scientific audiences. Students use ecological data collected in or near Las Cruces to create a project that presents one dataset in a non-traditional way.

Below are the educational results from over 450 students after the Desert Data Jam held in 2018:

- Students reporting high knowledge of the local environment increased from 15% to 76%.
- Students reporting high interest in the local environment increased from 26% to 60%.
- 51% of participants reported an increased interest in pursuing college studies or a science career.

Impressions from the Trip: A Major Opportunity for GDC and the Associates

Drylands host rich ecosystems that are present on every continent and cover over 40% of terrain in the world. Despite their largely waterless condition, dryland habitats are home to a variety of plants and animals and provide multiple services to humans.

The GDC was established at ASU to engage and synergize key stakeholders and institutions leading to global dryland sustainability through solution-oriented research, education, and outreach. Its vision is to become the world leader in discovery and education ensuring a sustainable future for drylands. Dr. Sala has long recognized the importance of K-12 STEM education to fulfill this goal by stimulating the next generation of scientists and conservation-minded citizens. Likewise, the Associates of GDC were formed to identify and support opportunities for education and research about the desert.

We were all greatly impressed by what we saw and learned on the trip. With only seven paid staff members and mostly private funding, Asombro serves over 25,000 students every year. Although there are many non-profit organizations in Phoenix that offer K-12 STEM programs, including ASU, none has the unique characteristics of the Asombro approach. In discussions after the trip, we shared enthusiasm about the opportunity for GDC and ASU to engage the community in this unique approach to science-based education about the local environment.

GDC and the Associates developed a plan for launching an initiative based on the Asombro methods here in Phoenix. The working title of the proposal is called "Phoenix Science Education through Drylands."



Proposal: Phoenix Science Education through Drylands

Adapting methods and material already developed at Asombro, we propose to create a similar program in the Phoenix area. The first step to achieve this ambitious and important goal is to conduct a pilot project with clearly defined parameters:

Purpose	Proof of concept, finalizing the form of the program for further implementation, and documenting results. Successful outcome will allow for gradual expansion throughout grades, schools, and districts in the Phoenix area.
Scope	<ul style="list-style-type: none"> • Collaborate with one Phoenix-area school system in support of project; • Focus on one or two grade levels; • Adapt Asombro methodology and other material to meet local education standards and to reflect the Sonoran Desert environment; and • Select/develop local opportunities for field experiences related to classroom material.
Timeframe	<ul style="list-style-type: none"> • Pilot Kickoff/Fundraising Campaign: Spring 2020 • Program Manager Start Date: Fall 2020 • Duration - Three years: Implement pilot during the first year and run the study for additional two years.
Costs	\$300,000: To cover Program Manager, consulting fees, and other program development costs and materials.
Resources	<ul style="list-style-type: none"> • GDC: Contribute leadership and guidance; offer connections with the School of Life Sciences, the Asombro Institute, and the ASU Foundation for fundraising support; and provide Program Manager with office space, computers, phone, insurance, lab truck, and library access. • Associates: Provide “seed” funding. • Local Foundations, Corporations, and interested individuals: Provide additional funding and support.



The Asombro Difference

Asombro, the Spanish word for “wonder”, annually serves more than 25,000 K-12 students and 1,500 adults in New Mexico and West Texas. Programs take place in classrooms, schoolyards, and at the 935-acre Chihuahuan Desert Nature Park site located north of Las Cruces.

Key features of all Asombro education programs include:

- Inquiry-based (students learn science by *doing* science).
- Aligned with national and local education standards, including the Next Generation Science Standards.
- Focus on local issues and ecosystems.
- Multiple exposures to students within each grade and over successive grades.
- Encouraging more students to pursue STEM careers by dispelling common stereotypes about scientists.
- Preparing students to be the future STEM workforce and science-literate citizens.

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*Ensuring a sustainable future for
drylands*

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Proposal, *Cont.*

To begin the pilot project, the GDC will hire a highly-qualified Program Manager. The Program Manager will identify partners, help organize the curriculum, and manage implementation of the pilot. The Program Manager will have background and experience in both science and K-12 education, and will report directly to Dr. Sala. The Program Manager will work with consultants from Asombro and elsewhere to assist with curriculum adaptation and development.

Next Steps

The ASU Foundation will continue to work with GDC staff and the Associates to develop a fundraising campaign that will commence in Spring 2020. We anticipate holding a kickoff meeting for Associates and other interested parties which will include a live presentation from Asombro's Executive Director, Stephanie Bestelmeyer, to elaborate on how the Asombro model in Las Cruces could apply to K-12 STEM education in the Phoenix area. The goal is to obtain funding pledges to hire a Program Manager and start work by the end of 2020.

Donate

Some pledges for this project have been received from some of our donors. If you would like to contribute to the Phoenix Science Education through Drylands, please Visit the Global Drylands Center website at <https://sustainability.asu.edu/global-drylands/contribute/>

