

SCAN
Southwest Collections of Arthropods Network

SCAN: Moving Beyond the K-12 Paradigm

Presented By:

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SCAN OBJECTIVES

The goal of SCAN is to create a virtual network of ground dwelling arthropods (beetles, grasshoppers, spiders, ants) which are known to be especially responsive to environmental changes.

Arizona State University
Brigham Young University
Colorado State University
Denver Museum of Nature and Science
Harvard University
Kutztown University
New Mexico State University
Northern Arizona University
Texas Tech University
Texas A&M University
University of Arizona
University of Colorado at Boulder
University of New Mexico
University of Utah

Understanding the Goals of Science and Education

- ▣ Before we can determine what the educational objectives of SCAN should be we need to understand the objectives of both science and education. From the perspective of science we want to connect audiences with collections and data, make public aware of scientific research, and hopefully change attitudes about science.
- ▣ As educators we want to do the above AND promote **meaningful engagement, critical thinking, creativity, cognitive enrichment, equity, and accessibility** while **impacting** and **transforming** how people view and connect with their world. That's a tall order!

Looking at NIBA as our E/O Framework

NIBA (The Network Integrated Biological Alliance)

Goal 6

NIBA 6.1 :

- *We need to conduct outreach to students from underrepresented groups (e.g., ethnic, cultural, physically challenged) with an emphasis on issues relevant to their communities.*
- *NIBA 6.1 Develop remote tools (e.g., mobile applications) that allow students and the general public to explore and interact directly with museum databases.*



Arizona Insect Festival University of Arizona

Each year the University of Arizona's Department of Entomology hosts the Arizona Insect Festival. This free event takes place in September on the UA campus, where thousands of visitors learn about the importance of insects in our lives and discover insect-based research taking place at the UA.



Northern Arizona University Colorado Plateau Museum of Arthropod Biodiversity

- ▣ Summer Bug Camps serving largely ages 7-13
- ▣ Traveling Arthropod Show - Does 10-15 shows a year serving some 2,000 students each year.



Diné College /Harvard University Navajo Ant Project

- ▣ The Navajo Ant Project is headed by Beverly Maxwell and is a collaboration between Diné College, Diné Environmental Institute in Shiprock, New Mexico, the Harvard University Native American program and Harvard's University's Museum of Comparative Zoology. The program is also collaborating with Neil Cobb at the Colorado Plateau Museum of Arthropod Biodiversity at NAU.
- ▣ The objectives of this research project is to assess the biodiversity of ants within two land types on the Navajo Reservation. The hypothesis is that there will be significant differences in ant biodiversity in undisturbed sites compared to the disturbed site.

▣



ETHNOBIODIVERSITY

- ▣ Goals of the project is to integrate traditional Navajo cultural values with the modern scientific method as it explores ant biodiversity on the Navajo Reservation.
- ▣ Traditional Navajo cultural values have been integrated with the scientific method. Blessing way ceremonies conducted by a medicine man has been performed prior to initiation of field collection of ants.
- ▣ Ant research protocol is also based on the Navajo four cardinal directions. Each direction is marked by a sacred mountain.
- ▣ Already, ant species new to science have been discovered on the Navajo Reservation.



Colorado Spider Survey: Citizen Science Project: Paula Cushing Denver Museum of Nature and Science

- In 1999 little was known about spider diversity in Colorado with no previous surveys conducted in that state, Paula Cushing who is the Curator of Invertebrate Zoology at DMNS decided to address this problem with a citizen science project.

er Survey


COLORADO **SPIDER** SURVEY

The Earth is home to a remarkable diversity of life. One of the main responsibilities of natural history museums is to collect, preserve, and document the diversity of organisms that share this planet with us.

The Colorado Spider Survey will establish DMNS as a major regional repository for this taxonomic group. Scientists and teachers worldwide will be able to access the data via the World Wide Web and borrow specimens for research projects.

But the DMNS needs your help! Coloradoans interested in learning about and collecting spiders are invited to become a part of this research project.

- *The importance of a Spider Survey*
- *Spider Survey Update*

A photograph of Paula Cushing, a woman with dark hair, smiling and holding a large, hairy tarantula spider in her hands. She is wearing a dark blue long-sleeved shirt. The background is a plain, light-colored wall.

- ▣ The survey was carried out through a series of Spider Identification and Collection Workshops held throughout the state. Workshops were led by a team of professional and amateur arachnologists (or spider biologists) and trained local communities in spider biology, morphology, taxonomy, and collection techniques. The specimens were collected and sent to the Denver Museum of Nature & Science (DMNS) for identification and storage.



Keeping the Public Motivated!

- ▣ Paula states, I knew that I would have to develop some means by which I could keep in contact with participants and keep them involved and engaged in such a long term project. To do this she sent out a project newsletter called the *Beat Sheet*. The newsletter kept participants informed and engaged in the project.



Spider Survey Results

- ▣ As a result of the program 800 people have been trained, to date with about 18% of attendees remaining active with the project.
- ▣ CSS participants not only became involved in the research, they also became spokespersons within their own communities about the importance of preserving biodiversity.
- ▣ When Paula began her position at the museum in 1998, the DMNS did not have an arachnology collection. They now have databased 30,000 vials of identified arachnid (these records have been entered into Symbiota) and have another 10 – 20,000 vials waiting to be identified.
- ▣ The CSS project has become not only a means of gathering critical information about the ecology and distribution of spiders in Colorado but has also been very effective in educating the public about the importance of biodiversity by involving them in a scientific project to record that diversity.

The Museum School of Biodiversity: ASU Franz Insect Lab

The Museum School of Biodiversity brings enrichment and hands-on learning to adult learners who are either pursuing their GED, gaining skills in an Adult Basic education program, or are learning English. Students gain science literacy skills via engagement with collections both at local museums and in the lab at the ASU Tempe campus.





Don't underestimate the power of art in communicating science. . .





Arizona State University: Connecting learners with collections using 3D Technology and Augmented Reality





Museum School Mentorship Program

Students work one on one with a mentor as they learn to:

- Digitize collection specimens.
- Enter specimens into databases and check georeferencing data
- Gain additional literacy and job skills
- Contribute to the creating of their own taxonomy learning tools



Lifelong Explorers

▣ Promoting cognitive enrichment and science across the ages. . .



Lifelong Explorer's Leave No Senior Behind Act

- ▣ Curriculum that is resident-centered, experiential in focus, and provides new level of meaning.
- ▣ An emphasis on adaptive and new ways of learning.
- ▣ The promotion of learning as a tool for wellness no less important than exercise or nutrition.
- ▣ To promote learning as a continuous process, not the traditional view of education as something you do only for a few years and then ends.
- ▣ To provide all seniors—regardless of cognitive, physical, and economic status access to enriching learning opportunities.
- ▣ To assist all seniors in bridging the science and technology divide.

Serving Diverse Learners...what we now know

- ▣ Need to continually assess/evaluate how to make science , collections, and its data accessible to all learners.
- ▣ The need to move beyond the K-12 paradigm to all levels of society.
- ▣ The need for transformative learning that promotes equity and addresses societal needs.
- ▣ The need to promote creativity, critical thinking, and cognitive-based learning.
- ▣ To teach science while acknowledging other ways of knowing. The need to consider ethnobiodiversity and traditional knowledge systems.
- ▣ To be prepared to take alternative pathways of learning

- *We need to ask ourselves. . .*

- What can I learn from others in the community? What do you know about the communities and populations you want to serve? How might our collections address a social need?

“Museums only fully develop their potential for action when they are actually involved in the major problems of contemporary society”.

--- Jan Jelink in 1975.

RESOURCES AND REFERENCES

<http://www.navajonature.org/ants/navajo-ants.html>

http://digbiocol.files.wordpress.com/2010/08/niba_brochure.pdf

<http://spiders.dmns.org/default.aspx>

<http://insected.arizona.edu/info.htm>

www.arium-museumschool.com



Teacher Resources:

<http://www.pedagonet.com/other/lspins.html>

For more information about this presentation:

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About SCAN contact Neil Cobb at Neil.Cobb@nau.edu

Does Anyone Know When Learning Ends?



Most lifelong learning programs that exist stop at number 1. . .marginalizing those groups who are in most need of cognitive enrichment.

Where to from here?

- To establish partnerships with TCN groups, colleges, universities, libraries, museums, and others to develop physical and virtual exhibits as well as other kinds of public programming and outreach that make use of collections data.
- To discuss how the development of new curricula will be aligned with Common core standards and the new Next Generation Science standards.
- To identify current gaps in existing learning resources that utilize collections and their data and how might we serve those gaps.
- To explore how might current biocollections and their data be made more accessible
- To examine NIBA 6 goals and determine how we might more effectively develop programs and products that align with those goals.
- How might new mobile and 3D technologies be utilized to integrate digitized specimens and data into a curricula.
- To identify funding and other resources to support needed curriculum, products, exhibits, or programs.

