

myaamionki: ašiihkiwi neehi kiišikwi (The Place of the Miami: Earth and Sky). T.J. McCoy^{1*}, D.W. Baldwin^{2*}, W. Olm³, G.M. Ironstrack^{2*}, R.A. Yingst³ and S.R. Doudrick^{4*} ¹Dept. of Mineral Sciences, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0119 (mccoyt@si.edu), ²Myaamia Project, Miami University, Oxford, OH 45056, ³Wisconsin Space Grant Consortium, Univ. of Wisconsin-Green Bay, Green Bay, WI 54311. ⁴Jet Propulsion Laboratory, Pasadena, CA 91109. * Citizen, Miami Tribe of Oklahoma.

Introduction: Science and indigenous cultures can be seen as diametrically opposed viewpoints in understanding our world [1]. Yet, they share many commonalities. Both are ways of interpreting our world based on direct observations, either over a short period of time to test a specific hypothesis for science or extended over many generations and passed through stories for indigenous cultures. The overlap is particularly strong for planetary science, where observations are interpreted in the context of place. Geologic observations on planets are interpreted in the context of processes deciphered from Earth, while indigenous communities have embedded in their cultures and languages viewpoints forged from a strong sense of place [2]. For the past two and a half years, we have worked within the Miami Tribe of Oklahoma to examine the overlap between science (specifically planetary science, geology, and astronomy) and traditional ways of knowing derived from myaamia culture. We have conducted a day and a half workshop in 2007 and a 5 day summer camp in 2008 for tribal youth. Here we review this work, as well lessons learned.

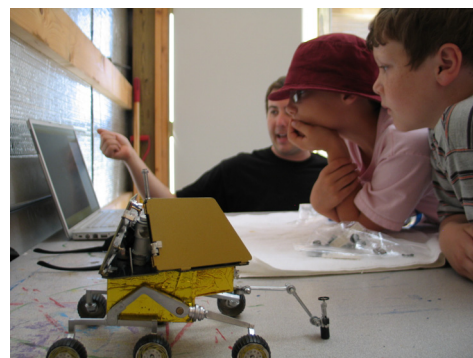
myaamiaki (The Miami People): A Central Algonquian speaking people, the Myaamia were historically centered along the upper Wabash River near Ft. Wayne, Indiana, although communities stretched down the Wabash and moved within a larger landscape encompassing parts of Illinois, Ohio, Michigan and Wisconsin. Forced removal in 1846 took the Tribe west to Kansas, with a subsequent removal to the northeast corner of Indian Territory in the 1870s, which became Oklahoma. There are currently ~3,500 members of the federally-recognized Miami Tribe of Oklahoma, which maintains tribal headquarters in Miami, OK.

National Gathering Week, 2007: In June, 2007, a day and a half workshop was conducted in association with the Tribe's National Gathering Week in Oklahoma. The event kicked off with an evening of star-gazing, focused largely on the importance of the Moon in myaamia culture, which follows a lunar calendar. The following day 8 Tribe (age <10) youth gathered to explore their landscape and compare it to Mars. The exercise focused on a stream in Oklahoma and comparison to Ma'adim Valles which flowed into Gusev crater on Mars. We first asked the students to explore the stream as a geologist might, ignoring the water, plants and animals and focusing on the record of water in the rocks, including shapes of rocks, their

location on a gravel bar and layered shale. We compared that to a myaamia perspective, in which isolating any part of the environment from the whole is outside of our cultural tradition. This expanded evidence for water beyond the water itself to, e.g., animal tracks and plants bent over by recent flooding and reinforced similarities and differences in ways of knowing.



A variety of activities followed, many of which would be familiar to those engaged in NASA-supported public outreach. These included making craters in flour, using a stream box to reproduce meanders, and examining images and videos from the Mars Exploration Rover mission. One activity with a more cultural bent was to examine shatter cones from the Serpent Mound impact crater, inside of which is the famous Serpent Mound effigy mound, testifying to the long-standing connection between culture, earth and sky in our homelands.



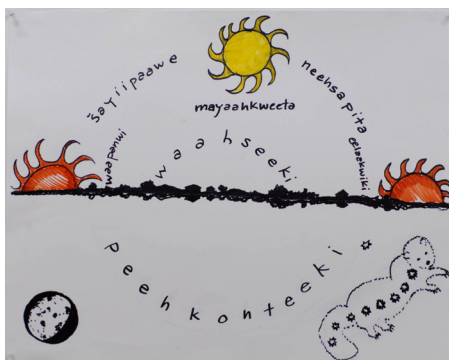
The day concluded with a return trip to the stream to search for fossils, exploring it this time as a rover might with all the inherent delays.

While reinforcing the important traditional concept of connection to place, the workshop had only limited use of myaamia language and largely presented concepts from a Western teaching style of presentation rather than discovery.

ewansaapita, 2008: Each summer, the Tribe hosts a week-long culture and language camp for tribal youth (ages 10-16) at a culture grounds in Oklahoma. The location includes restored prairie, woodlands, lake and stream habitats. The camp emphasizes inquiry-based experiential learning and uses the low student to teacher ratio to develop a culturally specific communal learning environment. The 2008 theme was “myaami-onki: ašiihkiwi neehi kiišikwi”.



kiišikwi (sky) activities focused on objects of cultural significance in both the day and night sky. Campers tracked the time of day by the position of the Sun (kiilhsua) and followed the phases of the Moon (kiilhsua) over the course of a week. They viewed the same night sky objects as our ancestors (aciika – the fisher; neehpikalaankwa – Mars) and viewed star groupings from a myaamia – rather than Western - perspective, envisioning sakia (the Great Blue Heron) rather than Cygnus.



ašiihkiwi (earth) activities centered on understanding the rocks of the area. Campers explored the stream bed at the site, collecting a variety of rocks, which the counselors and staff would then identify only in the myaamia language, reinforcing the knowledge of our ancestors. For some campers, the english names of the

rocks were unknown. They created “ahsena myaamionkonci” (the rocks from the place of the Miami) – a rock collection labeled only in myaamia that could serve for comparison to rocks at home.

Geology plays a particularly important role in northeastern Oklahoma, where the tailings from lead-zinc mining dot the landscape. Campers explored the history of this mining, visiting a mining museum and touring the abandoned mine structures and tailings piles. They also heard first-hand from a Tribe elder whose father worked in the mines, a particularly relevant activity since elder knowledge is an important aspect of indigenous communities.

As a concluding activity, campers created posters of myaamionki, labeled only in myaamia, reinforcing the idea that myaamionki isn't a two-dimensional map view of a place, but a three-dimensional place in which all things are part of a web.



Lessons Learned: This project succeeded in large part because of its non-traditional approach. Rather than using NASA-produced EPO materials which seem to be focused on reaching a large heterogeneous audience, we worked within a long-established Tribal structure to identify community needs and validate cultural knowledge and experience in the context of modern science. That structure – including the Myaamia Project, the National Gathering Week and ewansaapita camp – was critical to our success. Our greatest success was when we allowed Miami youth to explore ašiihkiwi neehi kiišikwi (Earth and Sky) within their landscape, to interpret within the context of their culture, and to express this new-found knowledge in their language. This approach, which reaches fewer youth and requires considerably greater resources, offers perhaps the best opportunity to engage indigenous community members in a dialog about planetary science.

References: [1] Deloria V. Jr. and Wildcat D.R. (2001) *Power and Place*. Fulcrum Publishing. [2] Semken S. (2005) *J. Geosci. Educ.* **53**, 149.