

Finding the way

Like their ancestors before them, four middle-school students dash into a stand of young aspen. Pausing to check location information, they twist their way through the trees. Suddenly one calls out. They've found what they're looking for: a pile of deer scat.

It's Forestry and Wildlife Week at the White Earth Math and Science Academy, a five-week enrichment program held each summer on the White Earth Indian Reservation in northwestern Minnesota. The students learn about animals by observing and discussing the evidence the animals leave as they pass through an area. The students also hone high-tech navigational skills by using handheld global positioning system (GPS) receivers. And they're having a blast.

A decade-long collaboration makes science and math meaningful for Ojibwe youth

It all began in 1998, when members of the White Earth Band of Ojibwe, including tribal historian and educator Andy Favorite, challenged the University of Minnesota to help engage struggling students in math and science. Extension and its partner colleges rose to the challenge, collaborating with White Earth representatives and the local Circle of Life School to produce a hands-on, outdoor-focused summer academy that builds powerful connections between academics, outdoor activities and Ojibwe culture.

Every year since, Extension faculty members have used a variety of hands-on approaches to present stereotypically tough topics in a practical but engaging way.

"They make it so much fun here," says Breanna, a ninth-grader at Mahnomen School. "It helps you understand science better. You have another way of looking at it, other than just books and pencils and paper."

Extension forestry educator Eli Sagor shows White Earth students Logan, Shayna and Madalyn how to map their paths in the woods using global positioning system (GPS) receivers.



More than vegetables



White Earth tribal historian Andy Favorite says Extension's success teaching math and science can be traced to collaboration and a strong outreach component—using hands-on, applied activities that are culturally relevant to Ojibwe youth.

By presenting students with activities that are fun and educational, the academy has raised math and science performance, reduced dropout rates, and ultimately prepared students for a successful career, all while honoring and nurturing traditional practices and values. Topics range from gardening to rocketry. Five years ago, Extension forestry specialist Charlie Blinn and forestry educator Eli Sagor added GPS as a way to tap into the appeal of technology.

"We had developed a GPS curriculum for loggers and natural resource managers, and we thought ... 'These kids can handle it, too,'" Blinn says.

The first session began with tribal members describing how ancestors would travel through nature's growing grounds, harvesting, preserving and stockpiling food.

"Berry season over here, fish netting over there ... maple sugar camps, wild rice camps, fishing camps, hunting camps—they were constantly on the move," Favorite says. To find their way back to the buried treasure, tribe members used traditional navigation skills, such as following the sun or noting where moss grows on trees.

Now Blinn and Sagor show their descendants how they can use satellite signals that pinpoint latitude and longitude to do the same thing. Students use GPS receivers not only to signs of animal life, but to hide and find paper lunch bags filled with berries and nuts, navigate to pre-set waypoints and map their path using computers, even find hidden clues that solve a word puzzle.

The academy is entertaining, for sure. But is it educational?

Absolutely, says Extension Crookston campus regional director Deb Zak, who worked with Favorite to create the academy. Every year, Zak says, students have tested higher in science and math after completing the summer program.

Not only that, but attitudes seem to be changing.

"I'm better at math and science now," says Logan, an eighth-grader at Mahnomens Secondary School. "And I'm probably going to go to college."

For more information on Extension's White Earth Reservation Academy program, visit www.extension.umn.edu/WhiteEarth

Math and science during summer vacation? Students on the White Earth Indian Reservation can't get enough. A far cry from boring math problems and rote science experiments, these sessions are filled with innovation, action and application. From astronomy to canoe-building and pottery to insect identification, students not only learn, but learn to enjoy learning, too.

One morning during the 2008 academy, middle-schoolers toured an innovative organic gardening project in Crookston. They learned about community-supported agriculture and the challenges and rewards of crop production. Not just "doing math" but finding out how productive and profitable a business can be, the students calculated the number of tomatoes, cucumbers and peppers the garden is likely to produce based on row spacing, number of rows and productivity per plant.

Extension horticulture educator Terry Nennich also taught the students about composting and measuring soil temperature. Clearly it's more than vegetables being cultivated here.

"Circle of Life School is a grow lab for mathematicians and scientists," says tribal historian and educator Andy Favorite.



Extension horticulture educator Terry Nennich peppers White Earth students with gardening-related mathematics questions inside a University research high tunnel.