

Camp features oldest and newest things

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Kids use geospatial technology and lasers to study dinosaur fossils

How would you like to learn the scientific method? Read page 27-z-z-z or use lasers to see if the sediment with the T. rex bones is continuous on both sides of the fossil-strewn arroyo?

Some northeastern Montana middle schoolers have just completed a unique camp that ties the allure of finding dinosaurs to the magic of technology. Out on a ranch in McCone County they discovered a triceratops frill, the rib and tooth of a Tyrannosaurus rex, what is possibly a new flowering plant for the Cretaceous period – and the scientific method.

Throw in sleeping in teepees and marshmallows with the campfire songs, and it's irresistible.

The University of Montana Paleontology Center, in partnership with Fort Peck Paleontology, has a \$1.3 million grant from the National Science Foundation for the Paleo Exploration Project to train teachers and students in science. More than two dozen teachers had two training sessions at Glasgow High School this spring in paleontology and geospatial technologies, including global positioning systems and geographic information systems. They have just put their new skills to work at two one-week camps in the dusty hills of the Hell Creek Formation, the richest source of fossils in North America.

Dr. George Stanley, director of the University of Montana Paleontology Center in the Department of Geosciences, was the lead faculty member of the camp.

"Kids not only learn about science, they do science," he said. "They found a raptor tooth, a T. rex tooth and a partial hadrasaur."

When the kids learned to locate a site with GPS and GIS, they were also learning how to do science, Stanley said. They had to create a hypothesis, test it, and see if it was proven or disproven. After a day's work, they entered their sites and findings on computer maps, analyzed data and interpreted what they had found.

"Paleontology is pure discovery," Stanley said. "One of the greatest highs you can get is seeing stuff no one has seen before."

The second camp ended last Friday at the Fort Peck Interpretive Center with video displays of the 27 kids in their four study groups. There were the Plantologists who found an intriguing fossil that may be a new flowering plant for the Cretaceous period, 135 million to 65 million years ago. That specimen will go back to UM for further study and identification. Austin Ekland of Glendive was especially fond of the little grains of amber, fossilized sap of conifers found in a coal layer.

The Rolling Stones examined sediment, which is the specialty of another faculty member on the team, Dr. Marc Hendrix. He was surprised but pleased to find that many of the students chose his subject group.

"Fossils are found in tombs of rocks, sediment," he said. He said it is exciting to integrate his work with dinosaurs, since sediments are traditionally not studied with fossils.

"These kids are doing what grad students do," he said. "They study what environment is represented: beach, river, swamp, how deep was it? How often did they flood? We are addressing relatively high-level questions with middle-school kids."

Fanci Jackson of Frazer said there are lots of layers in the arroyo. To find out if the layers on the south and north sides were once connected, they looked at the elevation of the layers and their composition. She demonstrated the Total Station, a measuring device that shoots a laser beam to a mirror and measures its return.

The Radical Rattlers studied fossilization at the triceratops frill site. Finding common rocks at fossil beds on different elevations, they concluded that the beds were once on the same level.

The Rippin' Rexes examined three different bone beds, including one where a T-rex bone and tooth were found, and decided that many of the plant and dinosaur fossils had been deposited by rivers, most at the same time period, since they were in the same stratum.

Taylor Fay of Sidney was in the Rippin' Rexes group. "I liked everything about the camp – even the cactus."

Austin DeShaw of Plentywood found out how to tell a fossil from an ordinary rock – if you put a fossil on your tongue it's supposed to stick.

Joe Wilcott of Whitewater was straightforward about it: "I got to dig and hammer at stuff."

Project director Heather Almquist said they are working to get a critical mass of teachers in these technical fields so they can do peer-to-peer mentoring and get support from each other.

"With these teachers living and working together every day, teams build. Real bonds have developed. Especially with schools so far apart, they need to connect to other schools," Almquist said.

The teachers come first, Stanley said. They were trained, then turned loose to transmit the knowledge to the students with the professors as only facilitators. He called it a "community of learners" approach. The students this year are actually guinea pigs in the process of teaching teachers.

The second week of camp included teachers from North Star, Harlem, Richey, Frazer, Plentywood, Scobey, Brockton, Nashua, Poplar, Hinsdale, Rocky Boy's, Terry, Glendive, Sidney, Froid and Whitewater.

One more workshop in Missoula will end this year's training. The teachers will tour Stanley's private museum for research, where their fossil findings will also be studied.

Summer camp is only part of the relationship between UM and Fort Peck Paleontology Inc., the field station that began as the preparation center for Peck's Rex. John Rabenberg, the president of FPPI's board, allowed the campers to dig in a coulee on his ranch south of Wolf Point this summer. Stanley also foresees UM creating a study center at Fort Peck where historians, anthropologists, geologists and others can study, using the materials found in Northeast Montana.

The UM-Fort Peck ties are being knit in subtle ways. Jose Garcia, one of the camp's group leaders, is a graduate student in geology and an artist who has color theories for painting illustrations of dinosaurs. He will stay on at FPPI to help dig and cast the partial hadrasaur that was found by the students this summer.

Eric Smith, owner of Explore Digital Education, the company that is assisting UM with the camp's computer technology and video filming, has left lasting improvements in the broadband

reception at the Fort Peck Hotel, where the teachers stayed. He showed the first in a series of videos he is making to inspire rural kids into careers in science and math.

Smith emphasized the good relations they have been forming with the local establishments, including of course local bars and eateries. He was surprised to find a real Jamaican reggae band at the Gateway.

"This is even more fun than I have in Missoula. I was very impressed," Smith said. "Everyone is very friendly and interested. They ask every day, 'What did you find?'"

Smith said this grant is not a normal one for the National Science Foundation. They usually do projects in very urban communities that reach a broad, dense audience.

"They took a chance on us on this project," Smith said. "They were sold on the fact that we are covering 50,000 square miles of very high-need communities."

The NSF is very interested in attracting Native American students, Stanley said, and Almquist successfully recruited for the camp on the reservations. He said Native Americans are a neglected group in science. In his 21 years of teaching, he has only had two Native Americans in his geology classes.

Stanley said this is the only NSF grant with this combination of paleontology and technology. He said, "Kids in the first grade think dinosaurs are cool, but by middle school something happens and they lose it. By high school scientists are nerds. We have to catch them in middle school, the formative time when they made decisions to go into science."

They caught Danielle Fyffe of Missoula at the right time. "When I heard they were going to dig dinosaur bones, I got really excited," she said.

Danielle took home memories of using a hammer and chisel, a plastic bag of real plant fossils, and, they hope, a new inclination toward science.