The Interior News-Way

A Newsletter By Leaders for Kansas 4-Hers in the Geology Project

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What's That Specimen?

Can you identify the specimen below? No worries if you can't! The image is taken from the weebly website, so take a look around and see if you can find it.
https://kansasgeology.weebly.com



Last Issue's Answer: *Fenestella*, a bryozoan fossil

Online Resources

The Sternberg Museum of Natural History, located in Hays, KS, has been an important stop for many in the geology project. But, the fun doesn't stop at just the museum! Their website contains information about their collections and programs, so you can continue to learn from home. Check it out:
https://sternberg.fhsu.edu/index.html

News and Upcoming Events

State Fair by the Numbers

This year at the state fair, we had 145 boxes, 16 educational displays, and a total of 3,857 specimens. This is up about 20% from last year. Wow! Thanks to Genna and Brenden for counting! Congratulations to everyone who entered projects this year!





Photos taken during judging. We put the new system to protect the specimens to use.

Save the Date: Sedgwick County Workshop Day

Save the date for **March 20, 2027**. There will be another workshop day held at the Sedgwick County Extension Office, in Wichita. There will be a concession stand, put on by Sedgwick County's Teen Council as a fundraiser. There will also be a give away for tickets to the Sam Noble Museum in Norman.
More details, such as the schedule, will come later. For now, you can sign up here:
https://docs.google.com/forms/d/e/1FAIpQLSfi5UJmIjutjgXnN-gjVwpBMbvVA5JXRqZvNPEcmxJpw0lHGw/viewform?usp=header

If you have a submission you would like to have considered for the newsletter, you can send them, along with your name and county, to Natasha Graham, the 4-H Geology Project Leader in Johnson County, at nlgraham95@gmail.com



Fossil Lake Safari Quarry
Kemmerer, WY

The Fossil Explorer Chronicles

Vol. 52 Million Years Back • By Genevieve Crouch

Uncovering Fossil Lake

About 52 million years ago, a near 1,500-square-mile freshwater lake covered three states in mid North America: Utah, Wyoming, and Idaho. This was the smallest of three large freshwater lakes in the area, alongside Lake Gosiute and Lake Uinta.

Fossil Lake itself was no more than a hundred feet deep and lasted around two million years. It fluctuated in size and briefly connected to Lake Gosiute. Eventually, shifting rivers, reduced rainfall, and regional uplift caused the lake to evaporate and streams to cut into the exposed layers.

Modern Excavation Sites

Today about 325 square miles of the lake remain to be excavated and studied. The Bureau of Land Management has about 59%, Fossil Butte National Monument is a mere 1%, private land owners account for 36%, and Wyoming State 4%.




Knox and Brenden C. at the American Quarry (left), Genna C. at Fossil Lake Safari Quarry (right).

Scientific Exploration

The first written recording of the deliberate study of the area were by scientists sent out by the United States government. Exploration of the Wild West was needed, and geologists and paleontologists assisted the military and railroads in mapping.

A Prehistoric Gulf Coast

In contrast to today's current Wyoming climate and environment, which is a cold, high elevation desert, the area was once a warm and wet environment. Today the landscape is covered with sagebrush and pronghorn. The ancient environment was much like the Gulf Coast is today. Salt water was present in the bottom of the lake with a low oxygen environment. This kept scavenging animals away, and was probably one of the reasons fossils are so well preserved today. Fresh water animals could not survive the saline environment. Snails could not feed on the microbial bed mat, that was composed of the cyanobacteria, that formed over the remains of the dead animals. The microbial beds kept the dead animals in place and from floating off. The mats would get covered with calcium carbonate precipitate. The calcium carbonate would disperse over the mats when the water was stirred by wind, or when algae blooms occurred. The microbial mats would form again over the dusting of the precipitate. These helped build the compressed light and dark layers you can visibly see in the rocks today. The precipitate became limestone and the microbial mat became kerogen.

"The microbial mats kept the dead animals in place and from floating off, building the compressed light and dark layers visible in the rocks today."

The Fossil Explorer Chronicles

Ecosystems, Quarry Digs & Discoveries

The Fossil Butte Member

The Green River Formation has three rock members: Angelo Member, Fossil Butte Member, and Road Hollow Member. The limestone rock matrix of the Fossil Butte Member, from which one can find the famous fresh water fish, is very platey and dusty. It's laminated, meaning it splits easily into thin sheets. It looks similar in color to the Fairport Chalk I have seen in Kansas. It pings clearly like limestone and does not thud like chalk.

Fossilized Fish

Twenty-seven types of fish lived in the lake, including the world's only articulated freshwater stingrays, gar, paddlefish, shrimp, snails, and crayfish, and schools of herring like fish called *Knightia* and *Diplomystus*. *Knightia* are Wyoming's state fossil. Those two types of fish are the most common and what one will often see for sale at rock shows or on display, preserved in large numbers from a large kill off of a school of fish.

Ancient Land Dwellers and Flora

Small horses called *Protorohippus venticolum* once lived in the area. They had longer hind limbs and hopped like a rabbit with padded feet. They were well adapted to moving through dense forest areas. The horses went extinct in the Americas long before Europeans introduced them again during explorations. Extinct Caiman called *Tsoabichi greenriverensis*, crocodiles, turtles, lizards, snakes, mammals like prairie dogs, gar, bats, frogs, salamanders, birds of all kinds, and many types of insects once covered the landscape. Although insects can be found, insects lived and died on land. They are not as commonly found because of the difficulty of splitting rocks on the exact layer where an insect is located. It was reported that about four new insects are discovered each year. Feathers, wings, scales, and lizard skin have been recovered. Trees with seed pods and winged seeds are well preserved along with dozens of different leaves and huge palms have been found.

A Humorous Legacy

One of the humorous, but prolific fossils one can find, is the vast variety of coprolites. The calm, still water led to the preservation of the fragile poop. When visiting Fossil Butte National Monument be sure to check out the restrooms. The coprolites are on display. The best part is, one can identify what sort of creature they came from.

Quarry Tourism

Fossil tourism is a fun adventure that you can pay to play at the quarries near Kemmerer, Wyoming. The fossil quarries in the area offer slightly different layers in the Fossil Butte member, called the “18-inch later,” “Upper Split Fish layer,” and “Lower Split Fish later” to dig in. But the result is the same, exceptionally well preserved fossils. Our family had the opportunity to travel and split limestone in two quarries thanks to the art contest that my brother Knox won over the spring. His prizes were quarry tickets in Wyoming, Utah, and New York. If you decide to check out this fossil tourism in New York, Wyoming or Utah, be prepared with empty space to haul a lot home! Any fossil lover will find it hard to leave the fossil finds behind.

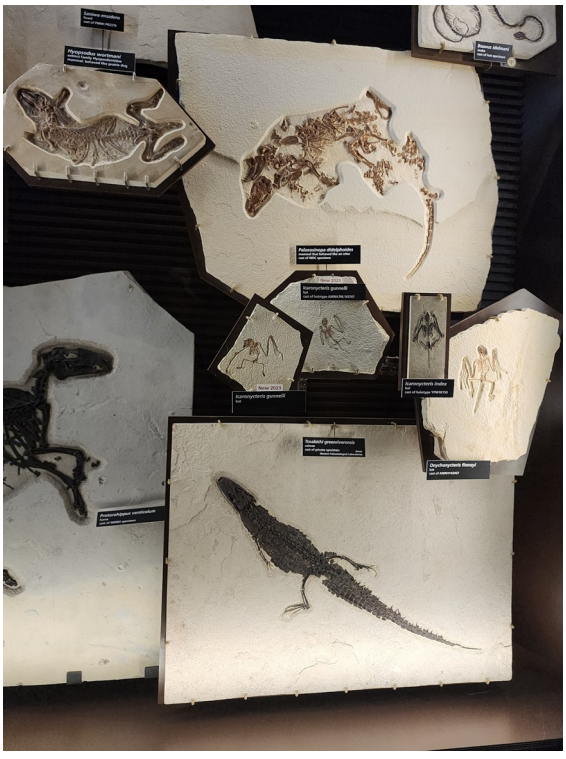
Quick Facts

- **State Fossil:** *Knightia* (Wyoming)
- **New Insects**: ~4 species found yearly
- **Quarry Tiers**: Upper/Lower Split Fish & 18-inch layers

Works Cited

1. Fossil Butte National Monument. *The Most Common Fossil.* Interpretive display, Kemmerer, WY, 3 Aug. 2026.
2. Fossil Butte National Monument. *A Scarcity of Insects.* Interpretive display, 3 Aug. 2026.
3. Fossil Butte National Monument. *Welcome to Fossil Lake*. Outdoor display, 3 Aug. 2026.
4. “Visitor Center Exhibits.” *National Parks Service,* U.S. Dept. of the Interior, 26 Sept. 2025, www.nps.gov/fobu.





Brad, Knox, and Brenden C. at Fossil Butte National Monument Visitor’s Center

Finding an Unusual "Rock"

by Sawyer E.

About 3 years ago I started finding cool rocks around my farm. Someone encouraged me to try the Geology 4-H project. I was contemplating doing the project and I decided to do it; I have been hooked ever since. The problem is I needed someone to help identify my rock, minerals and fossils. One of my fellow 4-H members introduced me to Rob Reves and that is how our friendship began. He has been a great mentor and leader to me in the project as well.

Fast forward to this year, we had multiple rains with large volumes of rain. One particular rain of 5+ inches of rain moved a lot of rock in the creek that I typically walk. On a Sunday evening, I asked my parents to go hunt this creek with me. I have probably walked this creek about 20 times. I have found a few things in this creek but mainly fossils. This particular day there was a lot of erosion that took place. Shifted the normal rock bar down the creek about 50 yards. I was hunting that bar and I was ahead of my parents a little bit. On this sand bar I saw a piece of metal sticking up out of the sand. I pulled it out of the sand and cleaned it up off a little bit. I told my parents I found a hat. My mom thought it was a ball cap type of hat and didn't even look up. My dad told me he thought it was a part off of farm equipment or part of a light. I was undecided on what it was but it still looked like a hat to me.

My mom told me when we get back to the house, we will send pictures to Rob Reves to see if he knew anything about this. My dad and mom started researching helmets to see if we could identify the hat. This is how I got introduced to the Old Abe Camp #16. An email chain got started to help me identify the helmet thanks to Rob. There was discussion on which helmet it could be as this one is pretty beat up and rusty. Rob then invited me to the Sons of Union Veterans of the Civil War Department of Kansas meeting.

On July 2nd I attended the meeting and presented my helmet. It was proven to be a WW1 1917 Kelly Helmet. The group discussed how a WW1 helmet got up in the area I was walking. The story is unknown as it was a few miles north of a WW1 route. I really appreciated the information I received about this helmet. Even seeing one in good condition at the meeting made me want to hunt and walk that creek even more.

My helmet is now part of my educational project in 4-H geology. My educational project for 4-H this year is about walking creeks and what you can find. I have some fossils, mineral and rocks in the show box. I have replicated an arrowhead as well. Part of the educational project is doing an essay about the project. Due to possibility of theft, I did not want to put the helmet in the box. I took pictures and put them in my project essay. This project won Grand Champion at our local fair and will be displayed at the state fair.

A lot of people know I like to hunt things that pertain to the geology project and this year I have really been successful with artifacts and some other geology items. I have had a lot of people ask me about the helmet and how awesome it was that I didn't just throw it away or keep on walking. I went on to get information about the helmet and shared the information via social media. I can

not thank Rob Reves enough for this opportunity and the members of the Old Abe Camp #16 for welcoming me to their meeting.



My mentor and friend Rob and I at the meeting of the Old Abe Camp #16 with the helmet.



Hunting a roadside cut in Manhattan.



The educational project show box.

Strataca Award Winners

Congratulations to everyone who was picked to display at the Strataca museum!



The 4-Her’s whose projects were picked are Knox C., Zoe C., Brenden C., Genevieve C., Joshua S., Chase K., Talon B., Easton B., Sienna W., Tyler K., Kate W., Cedric K., and Corbin B..

Finding Harry

by Corbin B.



My name is Corbin B., and this is my *Tylosaurus* I found, which we call Harry. His name is Harry because we named it after the landowner who let us keep the fossils. We found it on private land that we had permission to go on for the Sedgwick County geology field trip on September 28, 2025. I want to share with you about what a *Tylosaurus* is and how I found it.

The *Tylosaurus* is a marine reptile that lived during the Cretaceous period 80 to 90 million years ago. It is a part of the Mosasaur family. (Paul) The *Tylosaurus*'s phylum is Chordata and the class is Reptilia. Harry's genus (*Tylosaurus*) means knob lizard. (Ashworth) It was named the state fossil of Kansas on 4/4/2014. (Kansas Historical Society) They are squamates just like modern snakes and lizards. *Tylosaurus* lived in the Western Interior Seaway which is a shallow ocean that split North America in half from North to South. (Ashworth) They have also been found in other parts of the U.S.A. and Canada. Harry was found in the Niobrara Chalk Formation in Jewell County of North Central Kansas. Here, there used to be a limestone, chalk, and shale ocean floor that was good at preserving bones. (Everhart 8)

Tylosaurus was a marine reptile not a dinosaur. There are many varieties of *Tylosaurus*, Harry's species is probably the *Tylosaurus kansasensis*. The *Tylosaurus* was one of the largest mosasaurs to exist. They looked like a 40-foot-long alligator with skin instead of scales and four paddles instead of hands. A *Tylosaurus*'s tail was like an upside-down shark tail built to generate powerful thrust during ambushes. Their body was built like a torpedo. (Paul) It is estimated that they could swim 20 miles an hour. To help swallow prey, the *Tylosaurus* had a bone called the

quadrate which allowed the jaw to move independently. For large prey, they would rip them into smaller chunks. The teeth, as shown, are conical and are suited for seizing prey and minimizing escape. (Ashworth) Each of Harry's teeth are about an inch and a quarter long.

The *Tylosaurus* was an apex predator, so it had no enemies except for its own kind. The *Tylosaurus* ate literally anything that could fit in its mouth. They were carnivores and ate birds, sharks, large fish, plesiosaurs, small mosasaurs, and Pteranodons. (Everhart 5-6) The *Tylosaurus* used the knob on its nose to ram and strike prey. (Ashworth)

This is how I found Harry. Mom and I walked down into the rock quarry on our first stop of a geology trip. The quarry is used for scooping out chalk and shale to put on the dirt roads. This part of the quarry is known as the Niobrara Chalk Formation. It is about 650 feet thick and formed over a period of 5 million years. Chalk is soft and protects the bones for millions of years. That is why we find so much stuff there. The date was 9/28/25, "Let's go down to the outwash area," mom said. Because when it rains the little stuff like shark teeth wash up here. I did not just do a three hour car ride to find no shark teeth. I had not ever found any. I see a lump in the terrain. It turned out to be a giant clam. I obviously could not put it in my geology box, but it was still cool. Mom was fiddling with the clam, so I wandered away looking for shark teeth. Instead of shark teeth, I saw a dark lump sticking out of the ground. Upon closer inspection, I saw it was seven vertebrae sticking out of the ground. Mom heard me say, "Whoa! Look at this." She was excited too. She took pictures and I told Knox C., a friend, to come look at it. He knows a lot about geology, but he did not know what it was. Then, we asked all the leaders and they did not know. So, we uncovered the vertebrae, put plaster on, went to all the other stops, and then came back. We began digging it all out with pickaxes, shovels, and rock hammers. We excavated about four feet of vertebrae. A week later, on 10/5/25, we went back and spent around eight hours digging out more vertebrae and some ribs. (The plaster did not work well last time, so we did not use it.) On 11/1/25, we drove back to the site hoping to find the skull. At the end of our last trip, we marked where we left off. The people working on the fossil kept making jokes about finding the skull. At around 2 pm that afternoon, Mom uncovered a bone going perpendicular. Genevieve C. exclaimed, "It's a tooth!" We really had found the skull.

Something interesting is we had visited this site in June of 2025 for the Kansas State Geology field trip. Harry was not there. The excavators kept scooping out layers and removing them. That is how I was able to find Harry three months later in September.

The most fun part of all the trips was what we did when things got boring, like sword fighting with fence posts and exploring the quarry. A remarkable thing was that every time we pulled a piece up the vertebrae did not break!

At home, I worked on the skull to scrape away all the chalk on the surface with toothbrushes, dental tools, and water (which dissolves the chalk). After over 30 hours of work here it is. We did not take away all the chalk because if you look under the nose you will see teeth from the other side of the jaw. That means it is very smashed in there and if we remove all the chalk, it might fall apart. To protect Harry, I applied a special type of glue that makes the fossil stronger and keeps it from splintering.

Did you know George Sternberg (an American paleontologist born in Kansas) found a fossil similar to how I did. At age nine, he wandered away from his father's excavation and found a Plesiosaur, a smaller long neck marine reptile. He is the one who found the famous fish within a fish fossil. (Everhart 98)

I want to give thanks to Crista Burnett, my geology leader. Credit to the Crouch family for all their help with the trips and excavation. To Alan Meinholdt for making the box. Ramo Decker, for helping with identification, cleaning suggestions, and glue.

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