

INSPIRING **SCIENCE MAGAZINE** FOR GIRLS. FUN READING FOR ALL.

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and Birds**

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with technology*

**Light Pillars, Morning
Glory and more**

Weird Weather Phenomena

Fossils – Nature's Time Capsules

By Jeanne Panek

Do you love to solve puzzles? Are you willing to time-travel? Then pack your curiosity and get ready for adventure—we're going fossil-hunting!

Fossils are all around us. They're waiting to be discovered on beaches, in quarries, in state parks, even right under your feet. The La Brea tar pits bubble away in downtown Los Angeles, and paleontologists—scientists who study fossils—have found millions of fossils there, including mammoths, saber-tooth cats, and dire wolves. So, catch a bus, or even skate-board, to your favorite fossil site!



Fossils are ancient clues

Fossils, like time capsules from the past, are buried clues to the big questions humans have been asking for ages. What plants and animals lived on earth millions of years ago? Are they the same as or different from today's? (Did you know that 50 million years ago horses

were used to be dog-sized?) Ancient catastrophes—meteor impacts, earthquakes, and volcano eruptions—changed the planet. Life survived those times—what can fossils tell us about survival? Without fossils, we'd know almost nothing about the history of life on earth.

What prehistoric question most interests you?

Paleontologists read fossil clues

There are two general types of fossils: "body fossils" and "trace fossils." Both offer important clues.

Body fossils are the hard parts of plants and animals from long ago that have been preserved. Bones, shells, teeth, tree trunks—anything hard—can become a body fossil. Fossilization occurs over many thousands of years, transforming remains into a mineral copy of the original. Clearly, paleontologists have to be good sleuths, puzzling together so much of the past

with just the hard parts of the full plant or animal. Some body fossils have been found trapped in hardened tree sap (like insects), frozen in glaciers, or desiccated in the desert, but they're rare. "Trace fossils" are clues left behind that provide evidence without the actual body. Animal footprints in ancient riverbeds are trace fossils that show size, stride length, and weight. Feathers and plant leaves can get trapped in sediments which harden over millennia—after the organism decays, a trace fossil impression remains in the stone.



Solve a famous fossil puzzle



Dinosaur or bird? What do you think?

A fossil from 150 million years ago mystified paleontologists:

While this raven-sized body fossil has teeth, claws, and the long tail of a meat-eating dinosaur, trace fossils also show clear imprints of feathers—feathers designed for flight.

Turns out, it was both! Archaeopteryx (pronounced: ar-key-OPT-erix) was a flying dinosaur with feathered wings. The fossil record is especially good at showing changes over time, or evolution. Archaeopteryx was an early species showing dinosaurs evolving into birds.



Credit: W. Raab

Suddenly paleontologists faced even more questions. And the fossil record provided answers.

Did other dinosaurs have feathers?

Yes! Paleontologists have since found many fossil dinosaur remains with feathers, including a tyrannosaur relative of the T. rex.

Credit: Josephine Wu



Dr. Lisa White (left)—paleontologist at the University of California, Berkeley—has such an infectious enthusiasm for fossils, she's been featured on NOVA and Bill Nye the Science Guy.

The past is relevant for our lives today—paleontologist at work

Paleontologist Lisa White's research sounds like a pirate adventure—she sailed the deep seas digging for treasure. But her treasures were tiny ancient fossils critical to understanding ocean currents. Now at the helm of the University of California's Museum of Paleontology, she's passionate about making fossils meaningful for young people, particularly minoritized youth. She brings fossils from her museum's five million specimens to underserved classrooms around the San Francisco Bay Area, everything from dinosaur bones to teeny microfossils. She loves the racket in the room as excited kids make fossil discoveries.

Feathers suggest dinosaurs needed to stay warm, so were many dinosaurs warm-blooded?

Yes! Paleontologists recently analyzed fossil bone chemistry to show that many, but not all, dinosaurs were warm-blooded.



Dr. White brings students to remote fossil beds, too. A high school student uncovered a hadrosaur jawbone on a Montana field trip. It became part of her museum's collection, and the budding paleontologist—now enrolled at her university—shows off his fossil to friends.

You don't even need to leave your chair to go fossil-sleuthing! Many of Dr. White's museum fossils are online. Check out "Where the Wild Things Were" (<https://ucmp.berkeley.edu/education-outreach/where-the-wild-things-were/>).

Fossils are all around us, waiting for your curiosity. What prehistoric questions will you ask?

Did birds evolve from dinosaurs?

Yes! So many similarities have been discovered between dinosaur fossils and modern birds, paleontologists agree that birds are directly descended from dinosaurs—something you may not want to mention at the dinner table this Thanksgiving.