THE STANDARD

Patterns in the Fossil Record

Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

ANCHORING PHENOMENON

The Tiktaalik Fossil. A Fish With a Neck.

A fossil dug out of arctic rock layers in Canada. From one angle it looks like a fish: scales, fins, gills. From another angle it looks like something that could push up on land: a flat head, a neck (fish don't have necks), wrist bones inside the fins, room for lungs. It sits in layers right between fully aquatic fish below and four-legged land animals above. Exactly where the record says an in-between organism should be. The team that found it predicted the layer first, then went looking. Students will keep circling back to this all week.

DRIVING QUESTION

"What does it mean when a fossil shows up exactly where the rock layers predict it should?"

INVESTIGATIVE 1

The Horse Lineage. Small to Large, Many Toes to One.

A set of horse fossils laid out from oldest to youngest. The earliest one is dog-sized, with four toes on each front foot and three on the back, padded for walking on soft forest ground. Moving up the layers, the body gets bigger, the toes reduce, and the foot structure stretches into the single-hoof shape modern horses have. Use this to sharpen the lens the anchor is pushing on: the record doesn't just contain one in-between fossil. It contains whole sequences of them.

DRIVING QUESTION

"If you only had these horse fossils and nothing else, what story would the body changes tell you?"

INVESTIGATIVE 2

Whale Fossils With Leg Bones

Modern whales have no back legs. They live entirely in the ocean. But fossil whales in older rock layers have small back legs, hip bones, and even foot bones. The further back in the layers you look, the bigger the legs get, until you reach whale ancestors that walked on land. Modern whales still have tiny leftover hip bones buried inside their bodies. Same kind of change as the horse lineage, only the body plan shifted in the other direction: from land back to water.

DRIVING QUESTION

"Why would a whale have leg bones buried inside its body, and what does that tell us about its ancestors?"