

PaleoArt
Making Monsters

Teaching Guide For Grades 6 - 8

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Thank you for the International Coalition of Sites of Conscience,
the Institute of Museum and Library Services,
and the Illinois State Museum Society for their contributions to this exhibit.

International Coalition of SITES of CONSCIENCE

INSTITUTE of Museum and Library SERVICES

Illinois State Museum Society

Introduction

Art and science are unfortunately thought of as opposites, but they are actually quite complimentary. Throughout history, major scientists have used creativity and art as sources of inspiration and as ways to communicate their discoveries. Artists, on the other hand, use the natural world as a subject frequently, and often times employ scientific ideas in their creative efforts.

The field of paleoart is one very obvious way that art and science have been in conversation. Illustrating animals that people have never seen alive is a challenging task, and artists have variously experimented in different styles, while scientists often challenge and/or support their interpretations of fossil remains.

Paleoart, like many other kinds of arts, is accessible to anyone and everyone. Countless children have drawn dinosaurs, megalodon, and mammoths, the ancient beasts just waiting to jump from kids' imaginations and come alive on paper. This teaching guide will help you exploit this natural inclination while giving your students tools to think critically about the images they see in popular media, books, and museums.

Key Themes

- Paleontology
- Environmental Change
- Citizen Science
- Evolution
- Forming Hypotheses

Next Generation Science Standards:

MS-LS4-1.
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.

MS-LS4-2.
Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

MS-LS4-4.
Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

MS-ESS1-4.
Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

Objectives

Upon completion of this unit, students will be able to:

- Articulate the way that scientists form hypotheses, analyze evidence, and test their ideas
- Understand how scientists identify fossils
- Make sense of an extant phylogenetic bracket
- Illustrate their own paleo-artistic reconstruction
- Justify their reconstructions to their peers

Suggested Vocabulary

Paleontology: the study of past life through fossils

Anatomy: the study of organisms' physical structure

Extant Phylogenetic Bracket: a method paleontologists use to infer traits of extinct organisms by studying their living relatives

Hard Tissue: firm, inflexible tissue formed by living things, e.g. bones, teeth, nails, shells

Soft Tissue: nonhardened tissue found throughout organisms' body, e.g. skin, hair, internal organs, fat, tendons, and ligaments

Paleo-Art: The artistic reconstruction of ancient organisms

Adaptation: a trait that helps an organism survive in its environment

The Illinois Paleoart of Robert Larson

The five pieces of art presented on pages 6 -10 were painted by Illinois State Museum artist Robert Larson. As a boy Robert Larson always liked art and wild animals. When visiting museums, he saw that the two interests could be combined. He studied Fine Art at the Layton School in Milwaukee, Wisconsin. In the 1930s he sent some of his practice wildlife drawings to F.L. Jaques, a staff member of the American Museum of Natural History. Mr. Jaques critiqued the drawings and became a mentor for Mr. Larson.

Robert Larson started working as an exhibit artist for the Illinois State Museum in 1962 and after retiring in 1987, continued to paint murals for the Museum today. He began his first Ice Age mural in 1977 and completed five more in the 1990s.

Robert studied fossil, animal, and plant specimens in the Museum's collection. He also went to the sites in various parts of the state and make sketches and take photographs of how the areas look today. The basic landforms are similar to those that would have been in the area during the Ice Age.

Explore! Look at the art in the following pages. It is all based off of real Illinois discoveries!

Activity

Instructors will present the following five pieces of paleoart and use **visual thinking strategies** to encourage students to exercise their observational skills. VTS are centered around three key questions - see the **“Engage!” section on page 11.**









Engage! Consider asking students:

- **What do you see?**
- **What makes you think that?**
- **What more can we find?**

What is Each Painting About?

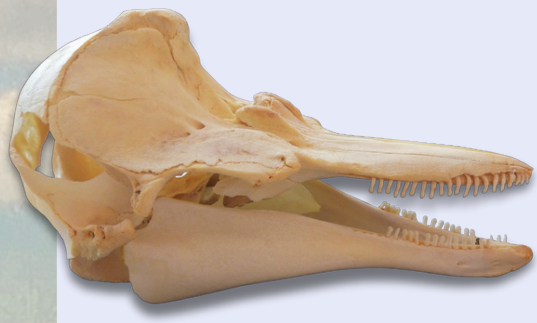
- **Page 6**: Mastodon, south of the glacier limits, 16,000 years ago.
- **Page 7**: Woolly mammoths, flat-headed peccaries, a sabertooth cat, and California condors in a southeastern Illinois scene of 30,000 years ago.
- **Page 8:** Giant tortoise, American horse, and vultures. Reconstructed after the Hopwood site in Montogomery County, south-central Illinois, 100,000 years ago.
- **Page 9:** Giant ground sloth, elk, and crows, Jo Daviess County, Galena Lead Region, 30,000 years ago
- **Page 10**: A giant beaver, a thirteen-lined ground squirrel, wolves, and a pair of stag moose in LaSalle County in north-central Illinois 16,000 years ago

Engage! Consider asking students to compare what these areas look like in the paintings versus what they look like now!

Paleoartists have to do more than make lifelike renditions of ancient animals - they also put time and effort into reconstructing behavior, landscapes, and plants. It takes weeks, months, even years of research to accurately convey the ancient past through images.

On the next page, you'll find the skulls and skeletons (**hard tissue**) of several animals. Opposite, you'll see what those animals look like with organs, muscles, and skin (**soft tissue**) on their bones. The lesson here is that bones alone only tell part of the story. Artists and scientists have to look for clues: muscles scars, the size of ear, eye, and nose openings, and consider an animal's integument (skin coverings).
Careful study of these bones (a practice called **comparative anatomy)** will point scientists in the right direction. We can also use an **extant phylogenetic bracket** to make the most probable inference. This is done by using a given organism's two most-closely related, living relatives. For example, paleontologists studying dinosaurs might look at birds (the direct descendants of dinosaurs) and crocodiles (their next closest relatives).

However, every reconstruction is a hypothesis, and they are almost never set in stone.













Evaluate!

- The best way to evaluate students' understanding of these principles is to have them practice them - luckily, the Illinois State Museum has more than enough fossils on display. Have students attempt to reconstruct the fossils below as if they were living animals. Most of the organisms are broadly classified below, but they are not given genus or species-level identification to prevent students from looking up other reconstructions.
- It is important to give students options for the medium they use to reconstruct their prehistoric animals. Sculpting, abstract, line art, pastels, colored pencils, watercolor, etc. are all valid forms of paleoart. Some paleoartists have even used abstract techniques to convey moods and ideas!
- Students should be able to articulate and defend their creative and scientific decisions, critique those of others, and contrast different approaches and decisions.



Fish Tooth



Mystery Aquatic Creature



Three big mammal skeletons



An arthropod-like animal



More Resources:

- How To Draw A Dinosaur: Children's Museum of Indianapolis
- SciArt Home Studio: Create a Dinosaur
- DIY Paleoart: Natural History Museum of Los Angeles County
- Paleoart: Not Just for STEM Majors
- Science of SpongeBob: LA County Museum
- PaleoArt: Painting the Land Before Time
- Comparative Anatomy Worksheet

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