

SKELETONS: Museum of Osteology

Animal CSI

Teacher Resource

Grade Levels: 6th- 8th

6th-8th Grade Oklahoma Academic Standards (OAS)

MS-LS1-1 From Molecules to Organisms: Structure and Processes

MS-LS1-1: Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.

MS-LS1-3 From Molecules to Organisms: Structure and Processes

MS-LS1-3: Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

MS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics

MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

MS-LS1-5 From Molecules to Organisms: Structure and Processes

MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

MS-LS3-1 Heredity: Inheritance and Variation of Traits

MS-LS3-1: Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

MS-LS1-7 From Molecules to Organisms: Structure and Processes

MS-LS1-7: Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

Program Overview:

The *Pathology* program introduces students to the world of forensic science. After a basic introduction, students will break-up into teams for hands on evaluation of the pathology of various specimens. Students will attempt to determine the cause of the abnormality, and the effect it would have had on the animal's life. After the analysis is completed, the team will report their discoveries to the class.

Learning Objectives:

- Students will identify and compare a damaged bone versus its undamaged counterpart.

- Students will examine various pathological specimens, and attempt to determine how the trauma, disease, or infection would have impacted the animal's life.
- Students will work in teams and communicate their ideas with their peers.

Background:

The pathology of a bone can tell you what may have caused an animal's death. Pathology is the study of damage that may be the result of trauma, disease or infection. These pathologic conditions might tell you if the animal was hit by a car, shot by a gun, died from a disease or was killed by another animal.

Vocabulary:

Bone Cancer: Malignant tumors that begin in bone tissue

Bone Infection: an infection of the bone or bone marrow resulting from surgery, trauma, or an infection

Cannon: The fused (reduced) foot bones of deer, cows, etc. that connect the ankle to the toes

Femur: The upper hind leg bone

Humerus: The upper front leg bone (arm)

Mandible: The jaw bone

Metatarsal: The bones of the hind foot located between the ankle and toe bones

Parasite: an organism that lives in or on its host and benefits by deriving nutrients at the host's expense

Pathology: Damage as a result of trauma, disease or infection

Radius/Ulna: The two bones that comprise the lower forearm (front leg) **Tibia:**

The lower hind limb bone (shin)

Reference: visit the Museum of Osteology Education web page at:

<http://museumofosteology.org/osteologyeducation.php>

Recommended Reading:

Beisaw, April M.

2012 *Identifying and Interpreting Animal Bones: A Manual*. Texas A&M University Press, College Station, TX.

Herriot, James

2014 *All Creatures Great and Small*. St. Martin's Press, New York, NY.

O'Conner, Terry P.

2008 *The Archaeology of Animal Bones*. Texas A&M University Press, College Station, TX.

Summers, Alleice

2013 *Common Diseases of Companion Animals*. Elsevier Health Sciences, Amsterdam, Netherlands.

While at SKELETONS:

- Visit the Pathology Exhibit and have your students discuss the scientific process they would use to evaluate pathologies.

- Have students try and determine the possible cause(s) of a particular trauma signature.
- Locate different healed and broken bones of animals throughout the museum.
- Discuss the process of bone remodeling.
- Find the reptile with the pathology in the Comparative Anatomy Exhibit.
- Find the animal injuries in the Pathologies Exhibit and discover what caused them.