

# SKELETONS: Museum of Osteology

## Animal Pathology

*Teacher Resource*

**Grade Levels: 9<sup>th</sup>-12<sup>th</sup>**

### 9<sup>th</sup>-12<sup>th</sup> Grade Oklahoma Academic Standards (OAS)

#### **HS-LS1-2 From Molecules to Organisms: Structure and Processes**

HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

#### **HS-LS2-6 Ecosystems: Interactions, Energy, and Dynamics** HS-LS2-6:

Evaluate the claims, evidence, and reasoning

that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

#### **HS-LS3-2 Heredity: Inheritance and Variation of Traits**

HS-LS3-2: Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

#### **HS-LS4-5 Biological Unity and Diversity**

HS-LS4-5: Synthesize, communicate, and evaluate the information that describes how changes in environmental conditions can affect the distribution of traits in a population causing: 1) increases in the number of individuals of some species, 2) the emergence of new species over time, and 3) the extinction of other species.

#### **HS-LS2-6 Ecosystems: Interactions, Energy, and Dynamics**

HS-LS2-6: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

#### **HS-LS2-7 Ecosystems: Interactions, Energy, and Dynamics**

HS-LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment biodiversity.

### **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 discover the possible 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:**

**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

**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 SKELETONS: Museum of Osteology Education web page at:  
<http://skeletonmuseum.com/education>

## **Recommended Reading:**

Beisaw, April M.

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

Broughton, Jack M. and Miller, Shawn D.

2016 *Zooarchaeology and Field Ecology: A Photographic Atlas*. University of Utah Press, Salt Lake City, UT.

Elbroch, Mark

2006 *Animal Skulls: A Guide to North American Species*. Stackpole Books, Mechanicsburg, PA.

Gilbert, B. Miles

1990 *Mammalian Osteology*. Missouri Archaeological Society, Columbia, MO.

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 exhibit on pathology and have your students discuss the scientific process they would use to evaluate the pathology.
- Have student try and determine the possible cause(s) of a particular pathology.
- Visit the Pathology Exhibit and have your students discuss the scientific process they would use to evaluate pathologies.
- Locate the 6 Pack Turtle in the Pathology Exhibit and discuss how this injury would have impacted this animal's ability to survive.
- Have students try and determine the possible cause(s) of a particular pathology.
- Locate different healed and broken bones of animals throughout the museum.
- Find the reptile with the pathology in the Comparative Anatomy Exhibit.
- Find the pathologies in the Manatee Exhibit and discover what caused them.