SKELETONS: Museum of Osteology

Animal CSI

Teacher Resource

Grade Levels: 6th- 8th

6th Grade:

Florida Next Generation Sunshine State Science Standards

SC.6.N.1.1 - Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

SC.6.N.1.2 - Explain why scientific investigations should be replicable.

SC.6.N.1.4 - Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.

SC.6.N.1.5 - Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.

SC.6.N.2.2 - Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.

SC.6.L.14.2 - Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life.

SC.6.L.14.5 - Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.

SC.6.L.14.6 - Compare and contrast types of infectious agents that may infect the human body, including viruses, bacteria, fungi, and parasites.

7th Grade:

Florida Next Generation Sunshine State Science Standards

SC.7.N.1.1 - Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

SC.7.N.1.5 -- Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.

SC.7.N.1.7 -- Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.

SC.7.L.17.2 -- Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.

SC.7.L.17.3 -- Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.

8th Grade:

Florida Next Generation Sunshine State Science Standards

SC.8.N.1.1 - Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

SC.8.N.1.4 - Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.

SC.8.N.1.5 - Analyze the methods used to develop a scientific explanation as seen in different fields of science.

SC.8.N.1.6 - Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.

SC.8.N.2.2 - Discuss what characterizes science and its methods.

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:

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 of 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/osteology-education.php

Recommended Reading:

Gilbert, B. Miles
1990 *Mammalian Osteology*. Missouri Archaeological Society, Columbia, MO.

Roest, Aryan I.
1991 *A Key Guide to Mammal Skulls and Lower Jaws*. Mad River Press, Inc., Eureka, CA.

Searfoss, Glen
1995 *Skulls and Bones*. Stackpole Books, Mechanicsburg, PA.

While at SKELETONS:

- 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.