

SKELETONS: Museum of Osteology

Locomotion: An In-Depth Look

Teacher Resource

Grade Levels: 9th - 12th

9th -12th Grade:

Florida Next Generation Sunshine State Science Standards

SC.912.N.1.1 - Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. **Pose questions about the natural world,** (Articulate the purpose of the investigation and identify the relevant scientific concepts).
2. **Conduct systematic observations,** (Write procedures that are clear and replicable. Identify observables and examine relationships between test (independent) variable and outcome (dependent) variable. Employ appropriate methods for accurate and consistent observations; conduct and record measurements at appropriate levels of precision. Follow safety guidelines).
3. **Examine books and other sources of information to see what is already known,**
4. **Review what is known in light of empirical evidence,** (Examine whether available empirical evidence can be interpreted in terms of existing knowledge and models, and if not, modify or develop new models).
5. **Plan investigations,** (Design and evaluate a scientific investigation).
6. **Use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),** (Collect data or evidence in an organized way. Properly use instruments, equipment, and materials (e.g., scales, probeware, meter sticks, microscopes, computers) including set-up, calibration, technique, maintenance, and storage).
7. **Pose answers, explanations, or descriptions of events,**
8. **Generate explanations that explicate or describe natural phenomena (inferences),**
9. **Use appropriate evidence and reasoning to justify these explanations to others,**
10. **Communicate results of scientific investigations, and**
11. **Evaluate the merits of the explanations produced by others**

SC.912.N.1.2 - Describe and explain what characterizes science and its methods.

SC.912.N.2.5 - Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.

SC.912.L.15.1 - Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.

Program Overview

Locomotion: An In-Depth Look familiarizes students with seven modes of animal locomotion, and their subtypes. Through hands-on observation of various skeletal specimens, students then work in teams to identify and define the types of movement, and present their findings to the class.

Learning Objectives:

- Participants will successfully identify modes of location by examining skeletal adaptations in a number of different species of animals.
- Participants will successfully work in a team environment and communicate their observations to their fellow classmates.

Background

Adaptation is a process of nature in which an organism becomes better suited to its habitat. Adaptations can be found throughout nature. In vertebrate species, these adaptations often affect the skeletal system. One obvious example of skeletal adaptation can be found in locomotion.

Locomotion is not the same as movement. Does anyone know how they differ? Take answers. All animals move, but not all animals locomote. Locomotion is defined as movement that results in progression from one place to another. Animals that spend all or nearly all their entire adult life in one place are called sessile. Animals that move around are called motile.

Locomotion has evolved to enhance the animal's success at finding food, reproducing, escaping predators, or escaping unsuitable habitats. Typically, the animal uses the same mode of locomotion for all these functions, but there are exceptions.

Vocabulary

Adaptation: a process of nature in which an animal becomes better suited to its habitat

Aerial Locomotion: is the act of flying

Arboreal Locomotion: applies to animals that live in and move through trees

Aquatic Locomotion: describes an animal's movement in the water

Carnivore: animals that primarily eat meat

Cursorial Locomotion: most land animals move about using this type of locomotion

Fossorial Locomotion: movement of animals that dig and live underground

Habitat: soil, water, climate, plants and animals of a particular ecosystem

Herbivore: animals that primarily eat plants

Saltatorial Locomotion: movement of animals that hop or jump

Predator: animals that attack and eat other animals

Prey: animals that are attacked and eaten by other animals

Vertebrate: animals with backbones

Lateral Undulation: the most common side-to-side motion exhibited by snakes

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

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:

- Have students visit the exhibits to identify the locomotive behavior of selected specimens.
- Visit the Locomotion Exhibit and compare the skeletal structure of the Cheetah as it is running to the 3D Cheetah model.
- Visit the Primate Exhibit to see how some primates utilize arboreal locomotion.
- Visit the Reptile Exhibit and discuss how the 20-foot Burmese Python is able to move from place to place without any limb bones.