

SKELETONS: Museum of Osteology

Locomotion: How Animals Move

Teacher Resource

Grade Levels: 1st and 2nd

1st Grade

Florida Next Generation Sunshine State Science Standards:

SC.1.N.1.1 - Raise questions about the natural world, investigate them in teams through free exploration, and generate appropriate explanations based on those explorations.

SC.1.N.1.2 - Using the five senses as tools, make careful observations, describe objects in terms of number, shape, texture, size, weight, color, and motion, and compare their observations with others.

SC.1.N.1.3 -- Keep records as appropriate - such as pictorial and written records - of investigations conducted.

SC.1.N.1.4 - Ask "how do you know?" in appropriate situations.

SC.1.L.14.1 --Make observations of living things and their environment using the five senses.

SC.1.L.17.1 -- Through observation, recognize that all plants and animals, including humans, need the basic necessities of air, water, food, and space.

2nd Grade

Florida Next Generation Sunshine State Science Standards:

SC.2.N.1.1 -- Raise questions about the natural world, investigate them in teams through free exploration and systematic observations, and generate appropriate explanations based on those explorations.

SC.2.N.1.2 -- Compare the observations made by different groups using the same tools.

SC.2.N.1.3 - Ask "how do you know?" in appropriate situations and attempt reasonable answers when asked the same question by others.

SC.2.L.14.1--Distinguish human body parts (brain, heart, lungs, stomach, muscles, and skeleton) and their basic functions.

SC.2.L.17.1 - Compare and contrast the basic needs that all living things, including humans, have for survival.

SC.2.L.17.2 -- Recognize and explain that living things are found all over Earth, but each is only able to live in habitats that meet its basic needs.

Program Overview

Locomotion: How Animals Move will familiarize students with a key feature to animal survival; locomotion. Much can be learned from observing the bones associated with motion: diet, predator-prey relationships, etc.

The participants will observe the skeletal features that define a particular type of movement, and then name and imitate that movement.

Learning Objectives

- Participants will successfully identify generalized skeletal features key to locomotion.
- Participants will successfully work in a team environment imitating and verbally communicate their observations to their classmates.

Background

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

Aerial Locomotion (“Flight”): is the act of flying. Skeletal adaptations aid in aerial locomotion by providing modified limb bones to form a wing as well as allow for muscle attachment. In bats, the only mammals capable of true flight, elongated arm and finger bones, combined with modified skin, form wings allowing them to fly.

Arboreal Locomotion (“Tree Climbing”): refers to species that live in and move through trees. These animals often possess physical adaptations that aid in this movement. These adaptations may include long limbs, prehensile tail, and claws. Animals that exhibit arboreal locomotion include squirrels, sloths, and monkeys.

Aquatic Locomotion (“Swimming”): as well as semi-aquatic locomotion, describes an animal’s movement in the water. Many species that live in the water possess aquatic locomotion to aid in their survival. Limbs modified into flippers are one of the most common skeletal adaptations found in aquatic species. Some animals exhibiting aquatic locomotion include dolphins, sea turtles, and penguins.

Cursorial Locomotion (“Running”): is the type of locomotion most terrestrial animals use to move about. This form of locomotion primarily refers to running. Many species exhibiting this type of movement have developed skeletal adaptations such as longer limbs, the reduction of toes, modification of the feet and development of hooves. Some cursorial species are dogs, cats, horses, and gazelles.

Fossorial Locomotion (“Digging”): as well as semi-fossorial locomotion refers to the modified movement of animals that dig and live underground. These species often have modified limbs to aid in digging, as well as, compact bodies and rudimentary eyes. Some fossorial species include gophers, moles, and mole rats.

Saltatorial Locomotion (“Jumping”): animals that use hopping or jumping to move. Species utilizing this form of locomotion have evolved large, muscular hind limbs and often have reduced forelimbs. Some saltatorial species include rabbits, kangaroos, and gerbils.

Lateral Undulation (“Slithering”): the most common side-to-side motion of snakes. It is achieved by the snake contracting muscles on one side of its body and then the other, resulting in a serpentine motion. Snakes using this motion on land will usually push off of irregularities in the landscape using their belly scales. Other types of movement used by snakes are concertina, rectilinear, and sidewinding.

Vocabulary

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

Carnivore: animals that primarily eat meat

Digging locomotion: movement of animals that dig and live underground

Flight locomotion: is the act of flying

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

Herbivore: animals that primarily eat plants

Jumping 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

Running locomotion: most land animals move about using this type of locomotion

Swimming locomotion: describes an animal's movement in the water

Tree climbing locomotion: applies to animals that live in and move through trees

Slithering Locomotion: the side-to-side motion performed 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.
- Have students visit the exhibits to identify the various types of locomotion that the creatures use to move about.
- 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.
- Have students look for the Tiger chasing the Blackbuck Antelope to see their predator-prey relationship in motion.
- Have students gently mimic the various types of locomotion in each exhibit.