WOODLAND PARK ZOO

Mammals at Woodland Park Zoo

Pre-visit Information

If you are planning a zoo field trip and wish to have your students focus on mammals during their visit, this pre-visit sheet can help them get the most out of their time at the zoo. We have put together an overview of key concepts related to mammals, a list of basic vocabulary words, and a checklist of mammal species at Woodland Park Zoo. Knowledge and understanding of these main ideas will enhance your students' zoo visit.

OVERVIEW:

There are over 5,000 species of mammals currently identified worldwide, inhabiting a number of different biomes and exhibiting a range of adaptations. Woodland Park Zoo exhibits a wide variety of mammal species (see attached checklist) in several different areas of the zoo. A mammal field trip to the zoo could focus on the characteristics of mammals (see "Concepts" below), comparing/contrasting different mammals or learning about biomes and observing the physical characteristics of mammals in different biomes.

CONCEPTS:

Mammals share the following physical characteristics:

- Fur or hair
- Endothermic, often called warm-blooded. Endothermic animals maintain a constant internal body temperature rather than adjusting to the temperature of their surroundings as ectothermic animals (such as reptiles and amphibians) do.
- Mammary glands, which are used to feed milk to young

Mammals, like all plants and animals, have five basic needs to survive—food, water, shelter, air and space. They inhabit every continent on the planet and range in size from Kitti's hog-nosed bat (also called bumblebee bat) at 0.07 ounces (2 grams) to the blue whale at 100 tons (approximately 90,000 kilograms).

Mammal Evolution

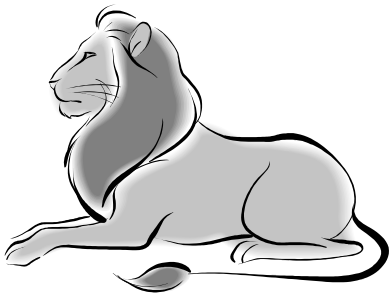
Taxonomically, mammals are an extremely diverse group. The first mammals appeared 230 million years ago, but remained small in size and in number due to the domination of dinosaurs. Approximately 150 million years ago, Pangea, the supercontinent on which all land-dwelling animals lived, began to break up. This aided mammal diversity because it caused geographic isolation of the continents. For example, marsupials (pouched mammals), not monkeys, occupy the trees in the temperate and tropical forests of Australia. Approximately 120 million years ago, ancestors of modern-day marsupials crossed the land bridge from South America to the landmass that would eventually become Australia and Antarctica. By the time placental mammals, which are ancestors of monkeys, evolved and spread outward, the land bridge no longer existed. Those marsupials that made it to Australia thrived and diversified in the absence of competitors. Marsupials in the rest of the world were outcompeted by placental mammals and eventually died off, with the exception of the opossums in North and South America. Eventually, Antarctica broke away from Australia and moved towards the South Pole. The cold temperatures and harsh climate that resulted were not conducive to the survival of marsupials.

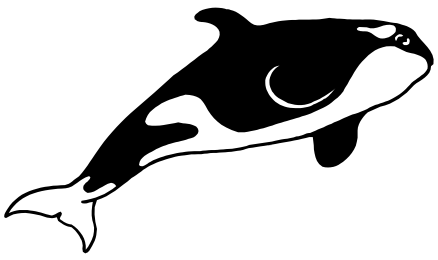
Approximately 65 million years ago, dinosaurs disappeared in a mass extinction, which killed 60 to 80 percent of all living species. The cause of this extinction is greatly debated among experts. The absence of dinosaurs as dominant predators allowed mammals to diversify and increase in size and number.

Mammal Taxonomy
Due to new findings and genetic data, mammal taxonomy is constantly under revision and classifications may change. Below is the most current classification of mammals agreed on by several reference sources.

Class Mammalia

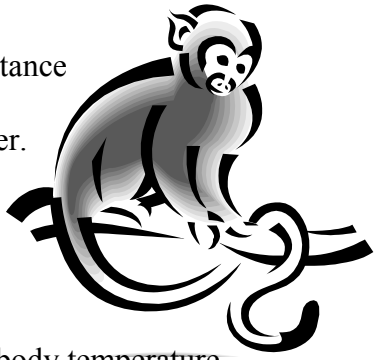
- Subclass Prototheria (egg-laying mammals)
    - Order Monotremata (monotremes)
- Subclass Theria (Therian mammals)
    - Infraclass Eutheria (placental mammals)
        - Order Afrosoricida (otter shrews, golden moles, ten recs)
        - Order Artiodactyla (even-toed ungulates)
        - Order Carnivora (carnivores)
        - Order Cetacea (dolphins, porpoises, and whales)
        - Order Chiroptera (bats)
        - Order Cingulata (armadillos)
        - Order Dermoptera (flying lemurs)
        - Order Erinaceomorpha (hedgehogs, moles, moonrats)
        - Order Hyracoidea (hyraxes)
        - Order Lagomorpha (hares, pikas, and rabbits)
        - Order Macroscelidea (elephant-shrews)
        - Order Perissodactyla (horses, rhinoceroses, and tapirs)
        - Order Pholidota (pangolins)
        - Order Pilosa (anteaters, sloths, tamanduas)
        - Order Primates (prosimians, monkeys and apes)
        - Order Proboscidea (elephants)
        - Order Rodentia (rodents)
        - Order Scandentia (tree shrews)
        - Order Sirenia (dugongs, manatees, and sea cows)
        - Order Soricomorpha (shrews)
        - Order Tubulidentata (aardvark)
    - Infraclass Metatheria (marsupial mammals)
        - Order Dasyuromorphia (dasyuroid marsupials and marsupial carnivores)
        - Order Didelphimorphia (American marsupials)
        - Order Diprotodontia (kangaroos, possums, wallabies, and relatives)
        - Order Microbiotheria (monito del monte)
        - Order Notoryctemorphia (marsupial moles)
        - Order Paucituberculata (shrew opossums)
        - Order Peramelemorphia (bandicoots and bilbies)





VOCABULARY:

***Adaptation:** Any change in the structure or functioning of an organism that is favored by natural selection and makes the organism better suited to its environment.
Carnivore: An animal that obtains nutrition by killing and eating other animals.
Crepuscular: Organisms that are active during dawn and dusk.
Diurnal: Organisms that are active during the daylight.
***Ecosystem:** A natural unit consisting of all plants, animals, and microorganisms (biotic factors) in an area functioning together with all of the nonliving physical (abiotic) factors of the environment.
Energy: The capacity to do work (includes heat energy).
Food chain: The eating relationships among organisms in an ecosystem where food energy is transferred from one organism to another as each consumes a lower member and in turn is preyed upon by a higher member.
***Food web:** The complex eating relationships among species within an ecosystem. In a diagram of a food web organisms are connected to the organisms they consume by arrows representing the direction of energy transfer.
Forest: A large, continuous stand of trees.
Herbivore: An organism feeding on producers such as plants, algae or lichens.
Insectivore: An organism that obtains nutrition by feeding on insects.
***Niche:** The position of a species or population in its ecosystem. A shorthand definition of niche is how and where an organism makes a living.
Nocturnal: Organisms that are active at night.
***Nutrients:** A food or chemicals that an organism needs to live and grow, or a substance used in an organism's metabolism that must be taken in from its environment.
Omnivore: An organism that obtains nutrition by feeding on plant and animal matter.
Oxygen: An atmospheric gas necessary for the process of aerobic respiration.
Skeleton: The bony, internal structure that provides support and protection for a vertebrate organism's body and internal organs.
Predator: An animal that obtains food by killing and eating other animals.
Prey: An animal that is killed and eaten by other animals.
Warm-blooded (endothermic): Refers to an organism that can control its internal body temperature, maintaining a relatively constant body temperate regardless of the external environmental conditions.



PRE- AND POST- ASSESSMENT:

The following activity will provide you with an understanding of your students' current knowledge of mammals. In order to encourage their creativity and expression, remind students that the accuracy of the information is not important. They are not being tested on what they know. Rather, this exercise is a way to reveal our preconceptions and often misconceptions about a topic. After your students have participated in their zoo field trip focusing on mammals, repeat the activity and compare student work from before and after.

<u>Mammals Concept Map</u>

Materials: paper, pencils

Ask students to take out one sheet of paper and a pen or pencil. Have them write the word "Mammal" in the center of their page, and draw a circle around it. Now, allow them at least 5 to 10 minutes to construct a concept map of their ideas and connections about the topic "Mammal." They can write down factual information they believe to know about the subject, memories about the subject, questions about the subject, or impressions about the subject. Encourage students to draw thoughtful connections between the sections of their concept map. Have students write their names and the date on their pages and turn them in to you. After your zoo visit the zoo or at the end of your study of mammals, return the concept maps to your students. Have them redraw their concept map on the backside of their page, following the above procedure. Ask students to reflect on if and how their concept map has changed? Discuss as a class what ideas were confirmed or possibly changed or corrected for students as a result of this unit.

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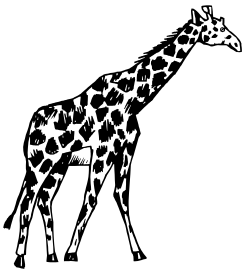
* Vocabulary words marked with an asterisk are included in the Washington State Science Standards.

Mammals of Woodland Park Zoo

African Savanna
- ❑ Reticulated giraffe
- ❑ Plains zebra
- ❑ Fringe-eared oryx
- ❑ Grant's gazelle
- ❑ Hippopotamus
- ❑ African lion
- ❑ African wild dog
- ❑ Patas monkey



Australasia
- ❑ Common wallaroo
- ❑ Red-necked wallaby
- ❑ Snow leopard

East Conservation Yards
- ❑ Lowland anoa

Day Exhibits
- ❑ Matschie's tree kangaroo
- ❑ Three-banded armadillo

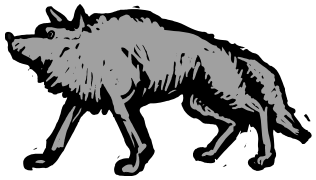
Northern Trail
- ❑ Gray wolf
- ❑ Arctic fox
- ❑ North American porcupine
- ❑ Brown bear
- ❑ North American river otter
- ❑ Rocky Mountain goat
- ❑ Roosevelt elk

Temperate Forest

West Conservation Yards
- ❑ Southern pudu

Asian Temperate Forest
- ❑ Red panda
- ❑ Japanese serow

Family Farm
- ❑ Ossabaw Island pig
- ❑ Panda miniature cattle
- ❑ Miniature donkey
- ❑ Nigerian dwarf goat
- ❑ African pygmy goat
- ❑ Katahdin sheep
- ❑ Kinder goat
- ❑ Domestic rabbit



Trail of Adaptations
- ❑ Sloth bear
- ❑ Sun bear
- ❑ Sumatran tiger
- ❑ Northern tree shrew
- ❑ Meerkat
- ❑ Two-toed sloth
- ❑ Tamandua anteater
- ❑ Rodrigues fruit bat
- ❑ Springhaas

Tropical Asia

Trail of Vines
- ❑ Orangutan
- ❑ Siamang
- ❑ Lion-tailed macaque
- ❑ Malayan tapir

Elephant Forest
- ❑ Asian elephant
- ❑ African elephant

Tropical Rain Forest

Jaguar Cove
- ❑ Jaguar

Tropical Rain Forest building
- ❑ Ocelot
- ❑ Golden lion tamarin

Tropical Rain Forest—African primate exhibits
- ❑ Red ruffed lemur
- ❑ Western lowland gorilla
- ❑ Black and white colobus monkey
- ❑ Red-flanked duiker

Note: This list is current as of September 2010. The zoo's collection is subject to change.

Questions about this information or your zoo visit? Please call 206-548-2424.