

Chapter Seventeen: Birds and Mammals

Teacher Notes

Lesson One: Characteristics of Birds

- Feathers-help birds stay warm and dry, attract mates, and fly
 - Preening and Molting
 - Preening-the act of grooming and maintaining their feathers
 - spread oil on feathers to waterproof them
 - Molting-the shedding of an exoskeleton, skin, feathers, or hair to be replaced by new parts.
 - Two Kinds of Feathers
 - Down Feathers-a soft feather that covers the body of young birds and provides insulation to adult birds.
 - are fluffy and lay next to body; are used to stay warm
 - Contour Feathers-one of the most external feathers that cover a bird and that help determine its shape
 - stiff feathers that cover wings and body
 - color and shape helps attract mates
 - have stiff central shaft with barbs that link together to form the smooth surface
- High-Energy Animals
 - to get the large amounts of energy needed, bird bodies break down food quickly
 - this process generates a large amount of body heat
 - birds can't sweat so they lay feathers flat and pant like a dog
- Fast Digestion
 - eat insects, nuts, seeds, or meat because they are high in protein and fat
 - a few eat grass, leaves, and other plants
 - food goes into the crop (stores food) then to the gizzard
 - gizzard has small stones to grind food
 - after passing through gizzard it goes to the intestines
- Flying
 - most birds have light-weight bodies, powerful flight muscles, and a rapidly beating heart which helps them get plenty of oxygen
 - flying adaptations
 - air sacs-special organs that store air so they have a continuous supply
 - rapidly beating heart pumps a fast, steady stream of oxygen-rich blood to the flight muscles
 - large eyes-allow birds to see objects and food from a distance
 - wing shape
 - short rounded wings-allow a bird to quickly drop and pull up
 - long narrow wings-are for soaring
 - rigid skeleton-allows a bird to move its wings powerfully and efficiently
 - powerful flight muscles-to move wings
 - keel anchors the flight muscles and allows the bird to flap wings
 - hollow bones-so their skeleton is lighter allowing it to fly
- Getting off the Ground

- Lift-an upward force on an object that moves in a fluid
 - allows birds to stay in the air
 - is affected by flying speed and wing shape
 - faster a bird flies the greater the lift; larger a bird is the greater the lift
- some air is forced over the top and some is forced underneath the wing
 - wings are curved on top which creates the lift
- Raising Baby Birds
 - Reproduce
 - sexually reproduce through internal fertilization
 - lay amniotic eggs and keep them warm
 - Nests
 - birds build nest
 - Brooding-to sit on and cover eggs to keep them warm until they hatch; to incubate.
 - birds sit on eggs until they hatch, sometimes it is done by just the female but in other species it is done by both male and female
 - Precocial and Altricial
 - Precocial-active soon after they hatch
 - covered with downy feathers
 - as soon as they can stand up they follow parents and can walk, swim and feed themselves
 - get warmth and protection from parents
 - Altricial-are weak and helpless for awhile after birth
 - when they hatch have no feathers
 - eyes are closed
 - can't walk or fly
 - parents keep them warm and feed them for several weeks

Lesson Two: Kinds of Birds

- Flightless Birds
 - most don't have the large keel to anchor flight muscles
 - some run quickly and some are skilled swimmers
 - includes penguins, kiwi, and ostrich
- Water Birds
 - include cranes, ducks, geese, swans, pelicans, loons
 - find food both in the water and on land
 - many eat plants, invertebrates, or fish
- Perching Birds
 - have special adaptation for resting on branches
 - includes songbirds like robins, warblers, and sparrows
 - when they land on a tree their feet automatically close around the branch
 - their feet will not open even if they fall asleep
- Birds of Prey
 - hunt and eat other vertebrate
 - may eat insects, other invertebrate, mammals, fish, reptiles, and birds
 - have sharp claws on feet and a sharp, curved beak

- most hunt during the day, but owls hunt at night
- includes owls, hawks, and ospreys

Lesson Three: Characteristics of Mammals

- The First Mammals
 - Mammals appeared in the fossil record 225 million years ago; were about the size of mice; were endotherms (could keep body a constant temperature), and hunted at night
- Common Characteristics
 - Making Milk
 - Mammary Glands-in a female mammal, a gland that secretes milk
 - milk is made of water, proteins, fats, and sugars
 - Breathing Air
 - use lungs to get oxygen
 - Diaphragm-a dome-shaped muscle that is attached to the lower ribs and that functions as the main muscle in respiration.
 - Endothermic
 - energy that is released as food is broken down keeps bodies warm
 - endotherms use internal chemical changes to keep body temperature constant
 - Hair
 - used to help keep warm
 - mammals are only animals with hair
 - thick coats of hair are called fur
 - most mammals have a layer of fat under hair for warmth
 - Specialized Teeth
 - 3 specialized kinds of teeth
 - incisors
 - canines-used to grab and hold food
 - molars-used to grind
 - meat eating mammals have large canines to help them eat prey
 - plant eating mammals have large incisors and molars to help bite and grind
 - Sexual Reproduction
 - all mammals reproduce sexually
 - sperm fertilizes eggs inside the body; for the most part mammals give birth to live young
 - newborn mammals stay with at least one parent until they are grown
 - Large Brains
 - brains of mammals are much larger than that of most other animals of the same size
 - allows mammals to respond quickly to events around them
 - use vision, hearing, smelling, tasting, and touching to find out about world

Lesson Four: Placental Mammals

- Mammals are divided into groups based on how they develop-placental mammals, monotremes, and marsupials
 - Most are placental mammals
 - Placental Mammals-a mammal that nourishes its unborn offspring through a placenta inside its uterus
 - the placenta carries food and oxygen from the mother's blood
 - Gestation Period-in mammals, the length of time between fertilization and birth
 - Placental Mammals are divided into 18 orders
- Anteaters, Armadillos, and Sloths
 - unique backbone connected between vertebrate
 - have small teeth (anteaters have no teeth)
 - most catch food with a stick tongue
- Insectivores
 - eats insects
 - includes moles, shrews, and hedgehogs
 - usually small with long, pointed noses
 - have small brains and simple teeth
- Rodents
 - more than one third of mammals
 - live on every continent except Antarctica
 - include squirrels, mice, rats, guinea pigs, porcupines, and chinchillas
 - have sensitive whiskers
 - have one set of incisors in upper jaw that grow continuously
- Rabbits, Hares, and Pikas
 - have sharp, gnawing teeth, two sets of incisors and shorter tails
- Flying Mammals
 - bats are the only mammals that fly
 - eat insects or other small animals; some eat fruit or plant nectar
 - vampire bats drink the blood of other animals
 - use echoes to find their food and their way (called echolocation)
- Carnivores
 - mammals with large canine teeth and special molar teeth for slicing meat
 - some eat only meat; others eat a combination
 - includes cats, dogs, otters, bears, raccoons, hyenas, sea lions, walruses
- Trunk-Nosed Mammals
 - elephants are the only mammals with trunks
 - used as a combination of upper lip and nose
 - used in the same way as our hands, lips, and nose; sprays water to cool off and put food in mouth
- Hoofed Mammals
 - Includes horses, pigs, deer, and rhinos
 - Hoof-is a thick, hard pad that covers a mammal's toe
 - most are fast runners
 - they have large, flat molars for grinding plants that they eat
 - include two orders – even toed and odd toed
- Cetaceans

- group of mammals made up of whales, dolphins, and porpoises
- all live in the water
- have lungs and nurse young which makes them different from fish
- use echolocation to find fish and other animals
- Manatees and Dugongs
 - smallest group of mammals that live in water
 - includes three species of manatees and the dugong
 - use front flippers and a tail to swim slowly through the water
 - live along ocean coasts and in rivers
 - eat mostly seaweed and water plants
 - spend all of their time in water but lift noses to breathe air
- Primates
 - includes prosimians, monkeys, apes, and humans
 - have five fingers on each hand and five toes on each foot
 - most have flat fingernails instead of claws
 - have larger brain than most other mammals of the same size
 - considered highly intelligent
 - have forward facing eyes, opposable thumbs
 - many primates live in trees
 - climb and grasp with hands and feet
 - eat leaves and fruits and hunt animals

Lesson Five: Monotremes and Marsupials

- Monotremes-a mammal that lays eggs
 - have all other characteristics of mammals-hair, mammary glands, diaphragm
 - lay egg with thick, leathery shells and uses body to keep them warm
 - mothers don't have nipples; babies lick milk from mammary glands
 - Echidnas
 - are only 3 species of monotremes; two are echidnas
 - about the size of a cat; have large claws and long snouts
 - The Platypus
 - only other living monotreme
 - only one species living today; lives in Australia
 - is a swimming mammal that lives and feeds in rivers and ponds
 - has webbed feet and a flat tail
 - uses a flat, rubbery bill to dig for food
 - uses bill to dig tunnels in river banks to lay eggs
- Marsupials-a mammal that carries and nourishes its young in a pouch
 - includes kangaroos
 - have mammary glands, hair, and specialized teeth
 - give birth to live young and then young continue to develop in the mother's pouch
 - are about 280 species of marsupials living today; most of them live in Australia, New Guinea, and South America
 - the opossum is the only living marsupial in North America
 - The Pouch

- marsupials are born at an early stage of development (just days or weeks after fertilization)

- newborns are hairless, and only their front limbs are well developed

 - use these limbs to drag themselves through their mother's fur to the pouch on her belly (this is done without any help from parents)

 - inside the pouch are mammary glands

- Kinds of Marsupials

 - includes kangaroos, wallabies, bettongs, and numbats, opossums, Tasmanian devils, and koalas

- Endangered and Extinct Marsupials

 - number is decreasing; at least 22 of Australia's native mammal species have become extinct in the last 400 years.

 - many have died because of species that have been brought to these areas and became predators of the native species

 - habitat destruction has also threatened species