

Biology 17.1

Aves

BIRDS

1. 27 orders of birds:
 - a. flightless- ostrich, penguins
 - b. birds of prey- falcon, eagle, vultures, owl
 - c. game birds- turkey, chicken, quail
 - d. water birds- 1) swimming (mallard), 2) diving (pelican), 3) wading (flamingo)
 - e. songbirds- sparrow, canary, cardinal
2. Habitat: ubiquitous, caves, trees, water, cliffs, etc.
3. Organization/design:
 - a. Wing shapes
 1. elliptical- short and wide, quick, maneuverable
 2. high-speed- long, thin, tapered
 3. soaring: long, thin glider wings.
 4. high lift wings: large, convex
 - b. Feet
 1. Thin, scaled or feathered, 3 or 4 claws
 2. Long legs for wading, flamingo
 3. tiny legs hummingbird
 4. muscled legs, ostrich
 5. swimming, webbed, duck
 6. climbing, woodpecker, chickadee
 7. grasping: talons of hawk
 8. perching: parakeet, muscle-tendon stretched when perched closes feet
4. Symmetry: bilateral
5. Integument:
 - a. feathers and scales, toothless beak
 - b. Feathers: 1) shaft and vane; 2) vane = barbs and barbules, 3)preening: oiling feathers using oil gland, water proof, 4) down feathers: barbules do not interlock, feather duster tuft, 5) contour feathers: most of the body and flight feathers, 6) molting: losing feathers in summer for fall migration, symmetrical loss
6. Skeleton:
 - a. porous, lightweight bone but strong
 - b. rotating vertebrae
 - c. movable tail bone- helps adjust tail feathers during flight
 - d. Trunk vertebrae, ribs and sternum fused
 - e. Keel: large ridge on the sternum for attaching flight muscles
 - f. wishbone: fused clavicles for flight muscles
7. Musculature: Striated, smooth, and cardiac muscle tissues.
8. Movement: mobile walking, running, hopping, flying
9. Nervous system/Senses:
 - a. Typical vertebrate- brain, spinal cord, cranial nerves, spinal nerves
 - b. Developed cerebrum, cerebellum for instincts, muscular coordination; and large optic lobes for sight. (Notice small olfactory lobes for smell.)
 - c. Ears: covered with feathers. sensitive to high pitches
 - d. Sight and hearing highly developed in birds, unlike reptiles, amphibians and fish.
 - e. Developed senses needed to avoid obstacles in flight, to spot food from a distance, to be alert to predators
 - f. E.G., hawk (rabbit at one mile), owl in 1/100 light needed by man
10. Behavior/activity:
 - a. Courtship: males attract females with color, song, and dance
 - b. Nest building differs in location, design, materials
 1. **Flamingo**: mud mound; **grebe**: floating raft; **sparrow**: sticks in a tree

2. **Weaver birds** of Africa: ball-shaped with entrance underneath (rain protection)
3. **Hornbills**: in hollow tree, seal opening with mud and debris. Male feeds her Through small opening.
4. **Emperor penguins**: on their foot under covering of skin
5. Brown-headed **cow bird**: lays its eggs in nest of others. Young cowbird eliminates competition and is raised by foster mother.
- c. Bird migration by instinct
 1. summer and winter migrations. 50% of all birds south for the winter
 2. warm weather and food best for high metabolism
 3. best condition for raising young
 4. Many travel long distances: arctic tern (17,700 miles)
 5. Some birds travel over water with no land marks- (Instinct)
11. Nutrition: Heterotrophic, some carnivorous, some herbivorous, and others omnivorous. Some birds eat more than their weight each day due to energy demand.
12. Digestive: 1) no teeth, 2) crop, 3) stomach (enzymes), 4) Gizzard for grinding, 5) high metabolism due to body T° and flight energy, 6) some eat more than their weight in a day, 7) hummingbirds live to eat, 8) Highly efficient: shrike digests mouse in three hours, (reduces weight and provides quick nutrition and energy), 9) beaks designed for food gathering
13. Respiration: 1) continuous fresh air flow with air sacs, 2) breathing is primary temperature control, no sweat glands, 3) syrinx: song box, singing
14. Circulation: 1) 4 chambered heart, 2) endothermic, 3) fast heart beat, e.g., chickadee(1000 beats a minute)
15. Immune system: Innate and specific. Big variation among classes.
16. Excretory: lack bladder. Cloaca used to excrete both intestinal and urinary waste.
17. Reproduction/Embryology: 1) Oviparous, 2) only one ovary and one oviduct mature, 3) Amniotic egg: egg is 1) abundant in food, 2) covered in albumin, 3) encased in hard shell. The actual egg is the yolk. Egg white is protective membrane.
18. Family life:
 - a. Family traits vary with 1) species, 2) incubation requirements and 3) needs of the young
 - b. Incubation: 1) Altricial- less than two weeks, fed and nested until feathered and flying; 2) Precocial; well-developed, feathered, self-feeding
19. Interesting facts about birds
 - a. The northern mockingbird (*Mimus polyglottos*) is the Arkansas state bird.
 - b. The bee humming bird egg is the size of a pea, the smallest egg in the world.
 - c. The ostrich lays the largest egg, and is also the fastest two-legged animal in the world (60 mph).
 - d. Two-thirds of all birds are found in tropical forests.
 - e. Some eggs have more than one yolk.
 - f. The kiwi bird in New Zealand has no wings, no tail, and no keel.
 - g. Hummingbirds drink twice their weight of nectar everyday.
 - h. The hooded Pitohui bird produces a dangerous toxin in its skin.
 1. Four species of birds are toxic to humans that can cause cardiac arrest, vertigo, and spasms.
 - i. The common poorwill of the American West is the one bird that hibernates.