Biology 16.3
Amphibians/reptiles/dinosaurs

Class Amphibia
1. About 6,974 species amphibians including frogs, toads, and salamanders
2. Habitat: aquatic and terrestrial, "Double life." 75% of all toads and frogs live in tropical rain forests.
3. Organization: triploblastic, systems, unidirectional gut, body cavity, segmentation, and **notochord**, and dorsal neural tube.
4. Symmetry: bilateral
5. Integument: moist, mucous, highly vascularized skin. Sometimes poisonous
6. Skeleton: bony
7. Musculature: innervated striated, cardiac, and smooth muscle tissues
8. Movement: mobile limbs
9. Nervous system/Senses: 1) Brain, 2) dorsal spinal cord, 3) cranial verves, 4) spinal nerves, 5) sight, smell, taste, touch, sound
10. Behavior/activity: innate and reflex, hibernation and estivation
11. Nutrition: carnivorous. Some are herbivorous during larval stage.
12. Digestion: typical alimentary canal system; Frogs use eyes to crush food so they blink when swallowing food.
13. Respiration: 1) gills, usually larval, 2) lungs not always used, 3) throat and mouth, 4) skin (90% for salamanders and frogs under water)
14. Circulatory: 1) closed, 2) 3 chambered heart, and mixed blood, 3) ectothermic
15. Immune system: Innate and specific. Big variation among classes.
16. Excretory: kidneys and liver
17. Reproduction/Embryology: Usually dioecious. Some monoecious. Oviparous
18. Life cycles: eggs, larvae and metamorphosis, tadpoles, external gills on salamander
    1. mud puppy remains aquatic
    2. some salamanders retain gills until no water, then lungs

Class Reptilia
1. About 9,800 species of reptiles including snakes, lizards, crocodiles, turtles
2. Habitat: aquatic and terrestrial.
3. Organization: triploblastic, systems, unidirectional gut, body cavity, segmentation, and **notochord**, and dorsal neural tube.
4. Symmetry: bilateral
5. Integument: dry, scaly skin that must be shed, and claws on toes
6. Skeleton: bony endoskeleton
7. Musculature: innervated striated muscle tissues
8. Movement: mobile limbs, slither
9. Nervous system/Senses: 1) Brain, 2) dorsal spinal cord, 3) cranial verves, 4) spinal nerves, 5) sight, smell, taste, touch, sound
10. Behavior/activity: innate and reflex
11. Nutrition: mostly carnivorous. Some turtles are herbivorous.

12. Digestion: typical alimentary canal system
13. Respiration: lungs
14. Circulatory: 1) closed, 2) 3 chambered heart, and mixed blood, 3) ectothermic
15. Immune system: Innate and specific. Big variation among classes.
16. Excretory: kidneys
17. Reproduction/Embryology: Dioecious. 1) oviparous, 2) amniotic egg : self-sustaining environment, embryo in a protective, porous shell, filled with protective membranes and fluid, lives on yolk.
18. Four orders: 1) squamata (snake and lizards), 2) testudinata (turtles), 3) crocodilia, 4) Rhynchocephalia (tuatara the only living species)
19. Interesting fact
    a. Longest measured snake on record is a reticulated python, (33 feet). Pythons average as the longest snakes.
    b. Anacondas can reached lengths of pythons but are more massive in body weight. The longest on record is 28’44” but weighed 500 pounds.
    c. Titanoboa in Columbia, now extinct, has a skeleton that measures up to 40 feet.
    d. The king cobra is the largest venomous snake in the world (12 feet), and the only snake that lays eggs in a nest.
    e. The infrared heat receptors in the pits along the lips of most boas and pythons and the nostril-like cavities of pit vipers can detect heat difference of 0.4 degrees Fahrenheit.

Class Sauropsida (Super order Dinosaurs)

1. Dinosaur= "terrible lizard". However, Dinosaurs are not reptiles. Their bone structure is different. Most are the size of a chicken, but many are very large (80 tons).
2. Habitat: aquatic and terrestrial.
3. Organization: triploblastic, systems, unidirectional gut, body cavity, segmentation, and **notochord**, and dorsal neural tube.
4. Symmetry: bilateral
5. Integument: very rare evidences of skin. Usually bumpy not scaly. Huge plant eaters may have had scaly skin.
6. Skeleton: bony endoskeleton. Hip bones, skull bones, teeth, ribs, and vertebrae are different from reptiles.
7. Musculature: dinosaur paradox of size/strength ratio for bone and muscle.
8. Movement: mobile limbs, walk, run, crawl, fly
9. Nervous system/Senses: 1) Brain, 2) dorsal spinal cord, 3) cranial verves, 4) spinal nerves, 5) sight, smell, taste, touch, sound
10. Behavior/activity: innate and reflex
11. Nutrition: Carnivorous, herbivorous, and omnivorous.
12. Digestion: herbivores may have depended on bacteria in the gut to help with digestion.
13. Respiration: lungs
14. Circulatory: 1) closed, 2) some believe dinosaurs had four chambered heart and were warm-blooded (Endothermic), however, evidence is lacking.
15. Immune system: Unknown

16. Excretory: Unknown
17. Reproduction/Embryology: 1) oviparous
18. Classified based on hip bones. Two major groups (orders) of dinosaurs: Ornithischia ("bird-hipped") and and Saurischia ("lizard-hipped").
    a. Ornithischian dinosaurs were herbivores. Many developed body armor.
        i. Ankylosaurs "fused lizards"- they were quadrupedal, and protected by body armor. E.g. Saichania
        ii. Stegosaurs "roof lizards"- quadrupedal, hoof-like toes on all four legs, front limbs of Stegosaurs were shorter than their hind limbs. E.g. Stegosaurus
        iii. Marginocephalia "fringed heads"- bony protrusions on the skull, such as bony ridges or frills. E.g. Triceratops
        iv. Ornithopods "bird feet"- bipedal runners, e.g. Duck-billed dinosaur.
    b. Saurischians included herbivores, omnivores and carnivores. They also had smaller holes in front of their eye sockets.
        i. Prosauropods- characterized having long necks and small heads, their forelimbs were shorter than their hind limbs and included a thumb claw. They were semi-bipedal. E.g. Plateosaurus
        ii. Sauropods "lizard-footed"- they were quadrupedal, had long necks, small heads, and usually had long tails, claws were located on three of five toes on each foot, some had body armor such bony osteoderms, clubs in their tails, or spined-backs. Some reached 130 feet in length. E.g. Brachiosaurus.
        iii. Theropods "beast-footed"- they were bipedal, their forelimbs generally had a highly restricted range of motion and relatively small to body, and most were carnivorous. E.g. T. Rex.