# Chapter 28-Animalia III

I. Phylum Chordata

A. General Characteristics

1. Contains \_\_\_\_\_ and \_\_\_\_\_.

2. Defined by the presence of a \_\_\_\_\_.

B. At some time in their life, a chordate has the following 4 characteristics:

1. Dorsal \_\_\_\_\_
   * All chordates start with a soft, flexible notochord, which in many is replaced with the \_\_\_\_\_ column.
   * Also known as the \_\_\_\_\_ (Vertebral Column) in vertebrates.
2. Dorsal, tubular \_\_\_\_\_cord
   * Also called the Spinal \_\_\_\_\_.
   * Runs down the back and helps the brain communicate with the rest of the body.
   * Often protected by the Vertebral \_\_\_\_\_ or Notochord.
3. \_\_\_\_\_ pouches
   * Seen only during \_\_\_\_\_ development in most vertebrates.
   * In invertebrate chordates, fishes, & some amphibian larvae, these become functioning Gills.
   * In terrestrial vertebrates that breathe with lungs, the pouches are modified for various purposes.
4. A \_\_\_\_\_
   * Extends beyond the \_\_\_\_\_ in all chordate embryos.

C. All chordates have

1. Have \_\_\_\_\_ symmetry
2. Are t\_\_\_\_\_
3. Are C\_\_\_\_\_
4. Are D\_\_\_\_\_ (anus first development)
5. Mostly Reproduce \_\_\_\_\_.

D. Subphyla of Chordates

1. Urochordata – \_\_\_\_\_
2. Cephalochordata – \_\_\_\_\_
3. \_\_\_\_\_ – fish, reptiles, amphibians, birds, mammals

E. Chordate Diversity – Characteristics that distinguish each chordate group from the preceding one (arranged according to complexity):

1. Tunicates & Lancelets are the simplest (no “\_\_\_\_\_”).
2. Presence of Cranium that protects the brain [hagfish].
3. Presence of Vertebrae that protects the Spinal Cord [lamprey].
4. Presence of \_\_\_\_\_ (bones that frame the entrance to the mouth) [sharks & rays].
   1. Presence of \_\_\_\_\_ for breathing [bony fish].
5. Presence of \_\_\_\_\_ for locomotion.
6. Birds (\_\_\_\_\_): vertebrates with one pair of limbs to walk, attach, grab, etc. (amniotic eggs)
7. \_\_\_\_\_-pods: vertebrates with two pairs of limbs that enables animals to walk on land.
8. Amphibians (lay eggs in water)
9. \_\_\_\_\_ Eggs – Reptiles, Birds, Mammary glands (Mammals)

II. Invertebrate Chordates

A. Subphylum Urochordata

1. \_\_\_\_\_ (SEA SQUIRTS):

1. Sessile marine animals that resemble a bag with two siphons.
2. Only the free-swimming larva has all 4 chordate characteristics.
3. They have a shape of a bag, \_\_\_\_\_ and \_\_\_\_\_-feeding animals.
4. They are found in seawater only.
5. They have a nerve cord and notochord at the tail of their larvae. The \_\_\_\_\_ is \_\_\_\_\_ replaced by the Vertebral Column.
6. Both the nerve cord and the notochord are lost during metamorphosis.

B. Subphylum Cephalochordate

1. \_\_\_\_\_:

* 1. Small, blade-like chordates that live in marine sands.
  2. Adults display all 4 major chordate characteristics.
  3. Closed circulatory system.
  4. \_\_\_\_\_ feeders.
  5. Dorsal anterior neural tube “cephalo-”
  6. 5-7 cm in length.
  7. Separate sexes.

2. E.g. amphioxus

III. \_\_\_\_\_ / Pisces

A. General Characteristics

1. Most diverse & abundant of vertebrates.
2. Vary greatly in shape, size, & color.
3. Occupy nearly all types of water (marine or freshwater).
4. Segmented backbones, and \_\_\_\_\_are present in this group.
5. “\_\_\_\_\_thermic” (\_\_\_\_\_blooded).
6. \_\_\_\_\_.

B. Main Groups:

1. Jawless Fish
2. Cartilaginous Fish
3. Bony Fish
4. Ray-finned fish
5. Lobe-finned fish

C. \_\_\_\_\_ Fish

1. Characteristics

1. Smooth, \_\_\_\_\_ skin.
2. Gills present.
3. \_\_\_ Jaws or Fins.
4. Notochord remains throughout organism’s life.

2. \_\_\_\_\_

1. “Agnatha” (former term)
2. Marine.
3. Eel-like \_\_\_\_\_.
4. No vertebrae.
5. Scavengers.
6. \_\_\_\_\_ but \_\_\_ vertebral column.

3. \_\_\_\_\_

1. “Agnatha” (former term)
2. Live in fresh water.
3. Complex eye.
4. Adults are parasitic on other fish.
5. No ossification (bones); actually have primitive vertebrae.
6. Some genes help to repair human spinal tissue.
7. \_\_\_\_\_

D. \_\_\_\_\_ Fish

1. Characteristics

1. Flexible skeletons of Cartilage, not bone.
2. Have movable jaws and paired fins.
3. Gills present; some must \_\_\_\_\_ \_\_\_\_\_ to keep water flowing over their gills.
4. Rays live partially buried in the sand and feed on mussels and clams.
5. Two well-developed senses enable these fishes to detect their prey:
6. \_\_\_\_\_ Line: \_\_\_\_\_ organ running both sides of the fish; collects information from the environment, such as vibrations & electrical currents.
7. Keen sense of \_\_\_\_\_.
8. Part of the brain associated with smell is twice as large as the other parts.

2. \_\_\_\_\_ and \_\_\_\_\_

* + - 1. Sharks are \_\_\_\_\_ that eat garbage & other waste from ships, injured fish & animals such as seals, turtles, birds, whales, crabs, & a wide range of fish.

1. Multiple rows of teeth constantly replaced. The shark’s mouth has 6 to 20 rows of backward-pointing teeth.
2. They can detect blood from an injured animal as far as 500 miles away.
3. They swim with a \_\_\_\_\_-to-\_\_\_\_\_ motion of their asymmetric tail fins.
4. Gas exchange requires constant passage of water over a shark’s gills. So, they must swim continually.

E. \_\_\_\_\_ Fish (Osteichthyes)

1. Characteristics

1. Bony Fish are the most numerous and diverse of all vertebrates.
2. Bony Skeletons.
3. Well-developed organs & organ systems.
4. Skin covered with \_\_\_\_\_.
5. \_\_\_\_\_ Fertilization
6. The central nervous system of Osteichthyes is comprised of a brain (\_\_\_\_\_) and a spinal \_\_\_\_\_ (as in humans) along with distinct Lateral Line.
7. Possess hinged gill covering that directs water over the gills, \_\_\_\_\_ the need for constant swimming.
8. Gas / \_\_\_\_\_ Bladder that helps fish adjust depth in the water due to buoyancy.
9. \_\_\_\_\_ are used in balancing and propelling the body.
10. Gills are kept moist by the passage of water through the mouth and out of the gill slits.
11. As water passes over the \_\_\_\_\_, \_\_\_\_\_ is absorbed by the blood, and carbon \_\_\_\_\_ is given off.
12. Two-Chambered Heart.

2. Two classes

1. \_\_\_\_\_-finned Fish:
   * Include: Eels, Minnows, Catfish, Trout, Tuna, Salmon, and others.
2. \_\_\_\_\_-finned Fish:
   * \_\_\_\_\_: have lungs
     + During droughts it burrows into the mud beneath stagnant water.
     + Coelacanths: “Living fossils” (deep in ocean).

IV. A\_\_\_\_\_

A. General Characteristics

1. Name means living on both: land and water.
2. Represented by
   1. \_\_\_\_\_
   2. \_\_\_\_\_
   3. \_\_\_\_\_
   4. \_\_\_\_\_
3. \_\_\_\_\_: vertebrates with two pairs of limbs.
4. \_\_\_\_\_thermic
5. Most amphibians have complex life cycles with time on \_\_\_\_\_ and in the \_\_\_\_\_.
6. Their \_\_\_\_\_ must stay \_\_\_\_\_ to absorb oxygen and therefore lacks scales.
   1. Often have Poison Glands in their skins.
7. Usually lay their eggs in water.
8. Small Lungs
   1. Respiration supplemented by gas exchange through their moist Skin.
9. Three-Chambered Heart.

B. \_\_\_\_\_ – Most change from an aquatic larval stage (develop legs and lungs, lose the tail, acquire carnivorous taste) to a terrestrial adult form.

C. \_\_\_\_\_ Fertilization

V. R\_\_\_\_\_

A. Living Reptiles include \_\_\_\_\_, Crocodilians, \_\_\_\_\_, \_\_\_\_\_.

B. General Characteristics

1. Skin covered with \_\_\_\_\_ and waterproofed with \_\_\_\_\_, which protects them from desiccation and from predators.
2. Well-developed Lungs.
3. Most are \_\_\_\_\_thermic, absorbing external heat rather than generating much of their own.
4. Most have a 3-chambered heart, except Crocodilians (4-chambered).

VI. \_\_\_\_\_ Fertilization

1. Reptiles, Birds, and mammals form an \_\_\_\_\_ egg – inside the egg are 4 internal membranes:

1. The \_\_\_\_\_is a \_\_\_\_\_-filled sac surrounding the embryo.

2. The \_\_\_\_\_ SAC contains a rich store of \_\_\_\_\_ for the developing embryo.

3. The \_\_\_\_\_ (and ALLANTOIS) enable the embryo to obtain \_\_\_\_\_ from the air and dispose of carbon dioxide.

4. The \_\_\_\_\_ also helps dispose of metabolic \_\_\_\_\_.

B. Type of egg/embryo development

1. \_\_\_\_\_parity:
2. \_\_\_\_\_ forms around the embryo after it is internally fertilized.
3. Female \_\_\_\_\_ the \_\_\_\_\_ containing the embryo to complete development before hatching (Birds).
4. \_\_\_\_\_parity:
5. \_\_\_\_\_ forms around the embryo after it is internally fertilized.
6. \_\_\_\_\_ in the female until it hatches, or just before it hatches (Sharks, Sea Horses).
7. \_\_\_\_\_parity
8. Shell does \_\_\_\_\_ form around an embryo.
9. \_\_\_\_\_ BIRTH after gestation period (most Mammals).
10. \_\_\_\_\_ – Structure through which an embryo receives its nourishment and performs gas exchange from the mother.

C. Regulation of Body Temperature

1. \_\_\_\_\_THERM:

1. Animal whose \_\_\_\_\_ \_\_\_\_\_ tends to fluctuate with the \_\_\_\_\_.
2. Invertebrates, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
3. Behaviors that help adjust body temperature: basking in the sun, burrowing into the ground, etc.

2. \_\_\_\_\_THERM:

1. Animal that maintains constant \_\_\_\_\_ body temperature by using heat generated by his own metabolism.
2. \_\_\_\_\_ and \_\_\_\_\_
3. Requires an enormous amount of energy and food.
4. \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ help retain heat.

VII. \_\_\_\_\_ / Aves

A. \_\_\_\_\_ – Study of Birds

B. Unique Features that set Birds apart from other Vertebrates:

1. Endothermic
2. \_\_\_\_\_
3. Anatomical Adaptations to Flight:
4. Tapered body with a \_\_\_\_\_ profile.
5. Bones are lightweight and \_\_\_\_\_, with internal struts that add support.

C. Powerful 4-chambered heart

1. Completely \_\_\_\_\_ oxygen-rich from oxygen-poor blood.

D. Unique Lungs (anterior and posterior air sacs) that supply the oxygen needed for flight.

1. The forelimbs function as Wings used for flight not grasping.
2. Highly developed muscles power the flight.

E. Body covered with \_\_\_\_\_

1. Provide \_\_\_\_\_
2. Enable a bird to \_\_\_\_\_
3. Important in \_\_\_\_\_ behavior
4. Built of the protein Keratin

F. The two hind limbs with clawed toes support body.

G. A toothless, horny Beak is present.

H. No Bladder

1. Metabolic \_\_\_\_\_ travels to the Cloaca, it is excreted in a semisolid, usually \_\_\_\_\_ mass along with undigested matter from the intestines.

I. Acute Vision and Well-developed Brains.

J. Ritualized \_\_\_\_\_ precedes Mating.

K. \_\_\_\_\_parous

L. High degree of \_\_\_\_\_ \_\_\_\_\_.

M. Most species’ eggs are incubated in a Nest.

N. Seasonal \_\_\_\_\_

1. Navigate by day and night, whether it is sunny or cloudy, by using the sun and stars, and even the Earth’s magnetic field to guide them.

VIII. M\_\_\_\_\_

1. Two Chief Characteristics
   * + 1. \_\_\_\_\_
2. Composed of Keratin.
3. Provides \_\_\_\_\_ against heat loss.
4. Allows mammals to be active even in cold weather.
   * + 1. \_\_\_\_\_ glands
5. Produce \_\_\_\_\_.
6. Enable female to feed their young without leaving them to find food.
7. Creates a \_\_\_\_\_ between mother and offspring that helps ensure parental care while the young are helpless.
8. General Characteristics
9. \_\_\_\_\_THERMIC
10. \_\_\_\_\_ blooded. Interior body temperature is regulated within a narrow range.
11. Brain is well-developed.
12. 4-chambered heart.
13. In most mammals, the young are born \_\_\_\_\_ after a period of development in the uterus (part of the female reproductive system).
14. Two Main Categories:
15. \_\_\_\_\_-laying Mammals (MONOTREMES)
16. \_\_\_\_\_-bearing Mammals:
    1. Two Branches:
17. MARSUPIALS
18. PLACENTAL Mammals
19. \_\_\_\_\_
20. \_\_\_\_\_ or Egg-Laying Mammals.
21. Lay \_\_\_\_\_-shelled amniotic eggs through a cloaca.
22. Duck-billed Platypus and Echidnas (Australia).
23. \_\_\_\_\_
24. Marsupials give birth to tiny immature young that crawl to a \_\_\_\_\_ on the mother’s belly immediately after they are born.
25. They attach themselves to milk secreting nipples, nursing until they are mature enough to survive outside the pouch.
26. Majority live in Australia.
27. Ex. \_\_\_\_\_, \_\_\_\_\_ and Opossums
28. \_\_\_\_\_ Mammals
29. Majority of Mammals are Placental, which \_\_\_\_\_ \_\_\_\_\_ young in the \_\_\_\_\_ until young can survive in the wild.
30. Oxygen and Nutrients are transferred from mother’s blood to baby’s blood (and vice versa) through a structure called \_\_\_\_\_.
31. \_\_\_\_\_ Period: time in which mammals develop in mother’s uterus.