Vertebrate Diversity Study Guide

To be filled out while you view the lectures and read the assigned text.

1. All members of  the phylum Chordata have the characteristics listed below:
2. All have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a stiff but flexible rod that extends the length of the body and serves as a point of attachment for the muscles.
3. A dorsal, hollow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - connects to the brain at the anterior end. Within the hollow is spinal fluid that nourishes the nervous system.
4. Pharyngeal  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which appear at some time in the development of chordates, may form functional respiratory organs in those animals with gills.
5. A Post-anal \_\_\_\_\_\_\_\_\_\_\_ (at some point in development).
6. All have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ development.
7. When do humans show these four features?
8. Looking at the phylogenetic tree of chordates answer the following questions:
   1. Are all vertebrates chordates?
   2. Which animal group is considered the most primitive chordate?
   3. What are the first animals with jaws that are in the chordate lineage?
   4. What is the difference between a craniate and a vertebrate?
9. Invertebrate chordates include:
10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (this is the one seen in the image its common name is a sea squirt).
12. The vertebrate chordates include:

* Fish

1. The only feature that the invertebrate chordates lack is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that is found in the vertebrates, so they are still chordates, simply not vertebrates.
2. The Jawless fishes include:
3. Which of the above examples actually has a backbone even though it is not bony?
4. Where do hagfish live?
5. Lampreys spend part of their time in marine waters and part of their time in \_\_\_\_\_\_\_\_\_\_\_\_ water habitats.  They eat on living fish so they are considered \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. The fish with jaws include:
7. Which group is considered more "derived" i.e. more recently evolved: the Chondrichtyes or the Osteichthyes?  Circle the correct one.
8. The presence of jaws is adaptive. What benefit does this important feature provide to those fish forms that have jaws?
9. Which group of fishes features a swim bladder? What is the purpose of this organ?
10. Know the function of this structure.
11. Fish have a two chambered heart, so why would 3 be better for land vertebrates?
12. Provide several examples of unusual Osteichthyes fishes featured in the presentation.

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1. Characteristics of the amphibians include:

* They live part of their life on \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and part in \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* They have a \_\_\_\_\_\_\_ chambered heart.  Note: why is this important?
* Always lay their eggs in \_\_\_\_\_\_\_\_\_\_\_\_, because they lack a protective shell to   prevent drying out. External fertilization the norm, but some cases where internal fertilization also occurs.
* Have a thin, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ skin, subject to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, some          species \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ through the skin, such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* Some amphibians also undergo \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ during development that includes a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ stage, often referred to as a tadpole in the case of frogs and toads.  This change is orchestrated by hormones.

1. Provide several examples of amphibians.
2. Characteristics of the reptiles include:
   * + Have a tough, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ skin that resists \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     + Have \_\_\_\_\_\_\_\_\_\_\_\_\_ fertilization of eggs, implying \_\_\_\_\_\_\_\_\_\_\_\_\_\_ organs.

* The egg that results from fertilization is called an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ egg,            which means that it features a leathery \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Also have a \_\_\_\_\_\_\_\_\_ chambered heart except for crocodiles

1. Characteristics of birds include:

* Have \_\_\_\_\_\_\_\_\_\_\_\_\_, which are highly modified and specialized \_\_\_\_\_\_\_\_\_\_\_\_ for \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and flight.
* Have adaptations that minimize their \_\_\_\_\_\_\_\_\_\_\_ such as hollow   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, reduced reproductive organ size (or number) in order to fly.
* Have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ egg similar to reptiles.
* \_\_\_\_\_\_\_\_\_\_\_\_\_ blooded with high metabolic rates, average temperature several degrees warmer than mammals – 104 degrees F.
* Efficient \_\_\_\_\_\_\_\_\_\_\_\_\_\_ systems that allow the flow of oxygen at all times through their bodies even during \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* First appear in the fossil record about 150 mya. The name of the intermediate animal is \_\_\_\_\_\_\_\_\_\_\_\_.
* Considered by many modern scientists to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reptiles.

1. Characteristics of mammals include:

* Distinguishing \_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_ for insulation and warmth.
* Have mammary glands that supply \_\_\_\_\_\_\_\_\_\_ for the \_\_\_\_\_\_\_\_\_\_\_\_ of their young.
* Give birth to \_\_\_\_\_\_\_\_\_\_\_\_ young with the exception of the platypus and              \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, both of the Australian region.
* Have well developed nervous systems and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Indicating high capacity for\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ behaviors.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ blooded with high metabolic rates.

1. Which mammal has fur and feeds its young milk but lays eggs? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Why is this an important animal to know about for the case of evolutionary biology?
3. What makes marsupial mammals different from placental mammals?
4. Eutherians complete their embryonic development within a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ joined to the mother by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.Examples of Eutherians include:
5. Address the diversification of the placental mammals throughout the planet.  How is this different than the other mammals mentioned previously such as the platypus & koala.