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| **iLearn BI 101** | **Vertebrate Diversity Assessment:**  **Comparative Vertebrate**  **Problem Set** | Name: |

Demonstrate your understanding of the phylum Chordata in this comparative problem set. To fill in your answers to each question, click on the grey text box and begin typing. When completed, submit this document through the assignment submission page on the Canvas course website.

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| **Phylum** | Chordata | | | | | | |
| **Subphylum** | Vertebrata | | | | | | |
| **Class** | Agnatha | Chondrichtyes | Osteichthyes | Amphibia | Reptilia | Aves | Mammalia |

1. What are the four defining hallmark traits that define the phylum Chordata?
2. Name the three classes in phylum Chordata that include fish.

Class **Agnatha** includes the first animals to develop an internal skeleton with a central nerve cord protected by cartilage.

1. Of the 4 hallmark traits that set chordates apart from the rest of the animal kingdom, which trait is uniquely different in and defines the class Agnatha? In other words, which of the four traits is in a different form than the rest of phylum Chordata?

Class **Chondrichtyes** includes sharks and rays, or fishes with a cartilaginous skeleton and the first group of vertebrates to develop paired appendages and Class **Osteichthyes** is the first group of vertebrates to develop a calcified skeleton.

1. Explain the evolutionary relationship between paired fins in fishes and the first vertebrates to invade land.

1. Explain the evolutionary relationship between swim bladders in bony fish and lungs of land locked vertebrates.

Animals in the class **Amphibia** were the first that were able to spend at least a portion of their life on land.

1. Name 3 members of the class Amphibia:
2. How do amphibians differ from fish? Name at least three adaptations that allow amphibians to live on land.

1. Describe amphibian reproduction, including where fertilization takes place (internal or external), the type of eggs laid, and where egg-laying takes place.

1. Compare and contrast amphibian adaptations to terrestrial life and reproduction with that of the bryophytes (e.g. mosses) and seedless vascular plants (e.g. ferns).

The class **Reptilia** includes turtles, snakes lizards, alligators and Komodo dragons. All of them have lungs to breathe on land and dry, scaly skin that does not need to be kept wet. They produce an amniote egg which usually has a leathery hard shell that protects the embryo from drying out.

1. What were the largest reptiles that ever lived?

1. What is an amniote egg?

1. How is production of an amniote egg an advantage over amphibian eggs?

1. Compare and contrast reptilian adaptations to terrestrial life and method of reproduction with that of the gymnosperms.

1. Some people say they don’t like snakes because they are slimy. Is this true? Name one thing that snakes do that is considered good by people.

The class **Aves** includes all of the 9,800 recognized bird species in the world (of which only 930 are found in North America and 350 regularly occur in Oregon). Although northern states generally support fewer species of birds than southerly ones, Oregon ranks fifth behind only Florida, New Mexico, Texas, and California in terms of numbers of species.

1. Speculate as to why this might be the case.

1. Name 2 major adaptations birds evolved for flight.
2. Name 1 major adaptation (different from above) birds evolved that fish, amphibians, and reptiles don’t have.

1. Name 2 characteristics of birds that differ from reptiles.

Humans are members of the vertebrate class **Mammalia**. There are approximately 5000 mammal species in the world making up only about .4% of known animal species. The entire phylum Chordata contains just over 3.7% of known animal species.

1. By comparison, well over ½ of known species are insects which are in the phylum     .
2. Name two traits that are unique to the class Mammalia.
3. Name two traits that we share with the class Aves.
4. There are both placental and non-placental mammals. Briefly describe how reproduction takes place in the following groups of mammals and give 2 examples of species for each.
   1. Placental mammals

* 1. Monotremes
  3. Marsupials

1. Biologists sometimes compare the angiosperms to the placental mammals. On what do they base this comparison?