



## Scientific Classification at the Birmingham Zoo

The word *zoo* stems from *zoology*, the science or study of animal life. Zoology is a vast subject, including many specialized fields. *Taxonomy*, for example, is the science of naming and classifying organisms. Classifying organisms is helpful because it assigns a universally accepted name to each organism, called a scientific name, and it places organisms into groups that have real biological meaning. Animals have traditionally been grouped by their *morphology*, or form and structure. Today, most biologists use *phylogeny* (evolutionary history of a species) to group organisms. Evolutionary relationships among organisms are established by identifying homologous structures in adults, developing embryos and well preserved fossils. This type of study is called *comparative anatomy*. Most recently these evolutionary relationships have been made by comparing and contrasting nucleotide sequences of DNA and RNA or amino acid sequences of proteins.

In the first part of this activity you will be exploring one animal's scientific classification. You must first understand how the classification system works. Scientific classification begins by grouping animals together by their most basic similarities. Then, it gradually divides the groups further through identifying more and more shared characteristics. Kingdom is the largest group in the classification system. There are five kingdoms. The Animalia kingdom includes all animals. Phylum is the second largest group. The animal kingdom may be divided into 20 or more phyla. One phylum, Chordata, includes all animals with a backbone. Class members have more characteristics in common than do members of a phylum. For example, fish, amphibians, reptiles, birds and mammals all have backbones, but each belongs to a different class. Animals within the same order are more alike than animals within the same class. For example, all flesh-eating mammals are in order Carnivora. Members of the same family are even more alike than members of the same order. Wolves and lions are both in the order Carnivora, but wolves are in the family Canidae with other dog-like animals and lions are in the family Felidae with other cat-like animals. A genus consists of very similar groups, but member of the same genus usually cannot breed with one another unless they are the same species. Species is the basic unit of scientific classification. Members of a species have many common characteristics, and they differ from all other species in one or more ways. Members of a species can breed with one another and the offspring grow up to look like the parents. Sometimes, groups within a species differ enough from other groups in the species that they are called subspecies.

Every animal has a two-part scientific name consisting of its genus and species. They may be known by different common names in different regions, but each has only one correct scientific name.

To begin this activity, obtain a zoo map from the front gate. Choose your favorite animal and proceed to that animal's exhibit.

## **Part I: Taxonomy**

1. What is your animal's common name? What is its scientific name?
2. Read the sign describing your animal. What does it say about other animals that are closely related to it? What similarities are there between those closely related animals?
3. Is the animal you picked a member of the phylum Chordata?
4. What class does your animal belong to?
5. What order does your animal belong to? Does it eat flesh, insects, or plants? Can you observe any food inside the exhibit? If not, the sign should tell you about its eating habits.
6. What family does your animal belong to? What are some other animals in the same family?
7. What genus does your animal belong to? What are some other animals that belong to the same genus? Some of them should be nearby.
8. What are some characteristics that animals within your animal's genus share? Which of those characteristics separates that genus from the rest of the family?
9. Are there any subspecies of the animal you chose?

You may need to use reference materials after your field trip to complete your answers before turning them into your teacher.

## **Part II: Morphology and Comparative Anatomy**

1. Draw a picture of your animal. Be as accurate as you can, but don't worry if you're not an artist.
2. Watch what the animal does. Note down anything you observe about how the animal uses its body on your drawing. Try to determine how the animal uses each part of its body, especially if that part is unusual in some way (e.g., rhino's horn, elephant's trunk, monkey's tail).
3. After you've observed the animal for 10 or 15 minutes, marking down how it uses its various body parts on your sketch, write a short description of what the animal does for the next five minutes. Zoologists sometimes have to observe animals for weeks or months to gather interesting observations about their behavior.
4. Look around the animal's exhibit. What kind of habitat does the animal come from? Can you notice any characteristics of the environment that seem to "require" some of the body characteristics you have previously observed?
5. Now, look at some of the animals of the same genus as your animal. What makes them different from your animal? Do they live in the same environment or a different one? Are they larger or smaller? Do they eat the same food or different food? What about their anatomy? Do they have long or shorter legs, larger or smaller ears, or other differing anatomy?
6. Write down your hypothesis about why your animal looks and behaves the way it does. Imagine that at one time, your animal and another animal of the same genus

(pick one that's similar) were part of the same species. Can you think of some reasons why they might have become more and more different over time?

## Animals at the Birmingham Zoo Listed by Common Genus

### **Agkistrodon**

*Agkistrodon contortrix* (Copperhead)

*Agkistrodon piscivorus* (Cottonmouth)

### **Anas**

*Anas cyanoptera septentrionalium* (Northern Cinnamon Teal)

*Anas georgica spinicauda* (Brown Pintail)

*Anas georgica georgica* (South Georgian Pintail)

*Anas platalea* (Red Shoveler)

*Anas sibilatrix* (Chiloe Wigeon)

*Anas punctata* (Hottentot Teal)

### **Ara**

*Ara ararauna* (Blue-and-yellow Macaw)

*Ara chloroptera* (Green-winged Macaw)

### **Corallus**

*Corallus caninus* (Emerald Tree Boa)

*Corallus hortulanus cooki* (Cook's Tree Boa)

### **Crotalus**

*Crotalus adamanteus* (Eastern Diamondback Rattlesnake)

*Crotalus cerastes cercobombus* (Sonoran Sidewinder)

*Crotalus durissus unicolor* (Aruba Island Rattlesnake)

*Crotalus horridus* (Timber Rattlesnake)

*Crotalus willardi willardi* (Arizona Ridgenose Rattlesnake)

### **Cygnus**

*Cygnus atratus* (Black Swan)

*Cygnus melanocoryphus* (Black-necked Swan)

*Cygnus olor* (Mute Swan)

### **Heloderma**

*Heloderma horridum horridum* (Mexican Beaded Lizard)

*Heloderma suspectum suspectum* (Reticulate Gila Monster)

### **Netta**

*Netta peposaca* (Rosybill)

*Netta rufina* (Red-crested Pochard)

### **Panthera**

*Panthera leo* (African Lion)

*Panthera tigris tigris* (Bengal Tiger)

*Panthera tigris corbetti* (Indochinese Tiger)

**Pituophis**

*Pituophis melanoleucus lodingi* (Black Pine Snake)

*Pituophis melanoleucus melanoleucus* (Northern Pine Snake)

**Ptilinopus**

*Ptilinopus magnificus* (Magnificent Fruit Dove)

*Ptilinopus pulchellus* (Beautiful Fruit Dove)

**Python**

*Python molurus bivittatus* (Burmese Rock Python)

*Python reticulatus* (Reticulated Python)

**Tragelaphus**

*Tragelaphus spekii* (Sitatunga)

*Tragelaphus strepsiceros* (Greater Kudu)

**Trichoglossus**

*Trichoglossus euteles* (Perfect Lorikeet)

*Trichoglossus haematodus* (Lorikeet)

*Trichoglossus ornatus* (Ornate Lory)