



CD-1537

SCIENCE ACTIVITY BOOK

*Learning About*

# MAMMALS

Grades  
4 - 8 +

- Definition • Classification • Scientific Names • Behavior • Adaptations • Food Chains
- Conservation • Research • Vocabulary • Observation Activities and More!

*Animal Life Series*



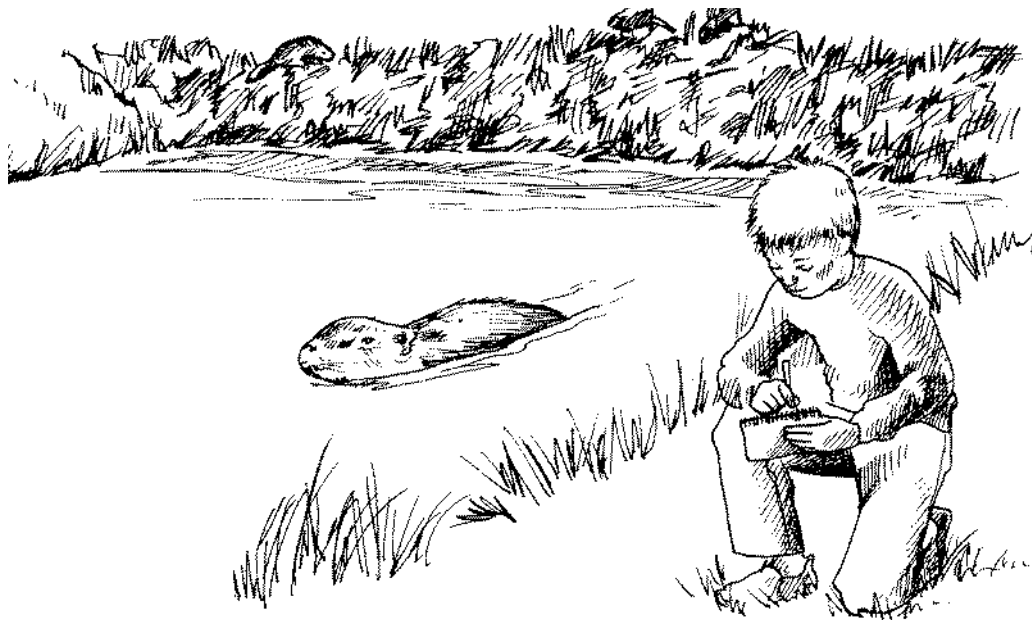
**By Debbie Routh**

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## Introduction

Welcome to a series of books devoted to the *Chordata* Phyla. A **chordate** is an animal that has a **vertebrate**, (backbone). Every animal in the animal kingdom can be subdivided into two main groups. The **invertebrates** (without a backbone) make up 95 percent of all the known animals. The **vertebrates** (with a backbone) make up only five percent of the animal kingdom. The vertebrates are then subdivided even further into seven classes: the three classes of fish, amphibians, reptiles, birds, and mammals. This book is devoted to a diversified group of animals called **mammals**, also known as class *mammalia*.

Mammals live in a wide range of habitats and are the most diversified class of vertebrates. Do you know what diversified means? **Diversified** means that vertebrates are varied in their structures, largely due to their adaptability to their habitats. Organisms must be well suited to their environment, or they could not survive where they live. Due to specialized adaptations, mammals have a wonderful ability to live and survive everywhere. Mammals may be very diversified, but they still have many traits or characteristics in common. Student observers will use many scientific process skills throughout this series. The reinforcement sheets that follow the lessons contain at least one higher-level thinking question. So, student observers, put on those thinking caps and use your process skills to observe, classify, analyze, debate, design, and report. This unit contains a variety of lessons that will help you practice scientific processes as you discover all about mammals. Come on, student observers, let's use our critical thinking skills to take a closer look at the world of mammals.



\* **Teacher note:** Each lesson opens with a manageable amount of text for the student to read. The succeeding pages contain exercises and illustrations that are varied and plentiful. Phonetic spellings and simple definitions for terms are also included to assist the student. The lessons may be used as a complete unit for the entire class or as supplemental material for the reluctant learner. The tone of the book is informal; a dialogue is established between the book and the student.

## What Is a Mammal?: *Definition*

Kingdom: *Animalia*

Phylum: *Chordata*

Subphylum: *Vertebrata*

Class: *Mammalia*

Hello, student observers! Today, we are going to take a closer look at a group of complex vertebrates, the mammals. Mammals are the conquerors of the earth. Some scientists believe that all modern mammals came from animals called *Therapsids* (THER-up-sidz). The early mammals did not have to compete for food or living space after the dinosaurs died out. The mammals survived, reproduced, and became the most successful group of animals.

Fossils show us that mammals are the **newest** animals on the earth. The main characteristics of this new class of animals are:

Mammals have a **spine** (backbone), which is made up of small bones called **vertebrae**. They have a **notochord** (nerve cord) that runs along the spine, connecting it to the skull.

Mammals have hair on their bodies at some time during their lives. Many have fur that traps air and helps keep them warm. Others have very little hair and rely on fat under their skin to keep them warm.

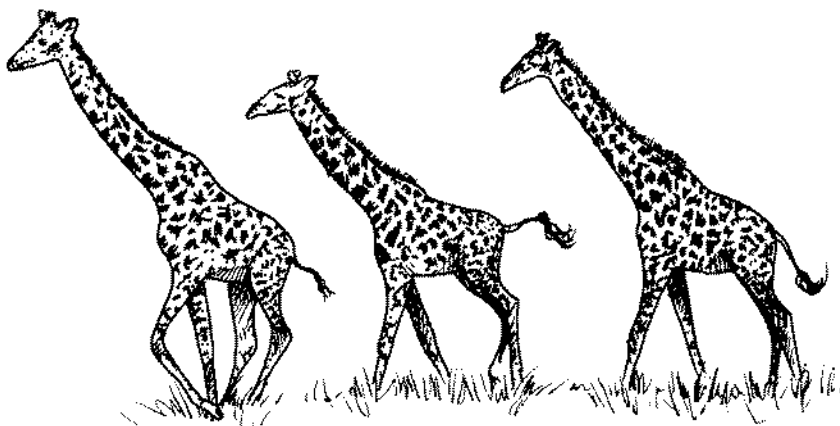
Mammals are **endothermic** (warm-blooded), meaning their body temperature remains the same regardless of the surrounding air or water.

Mammals have **mammary glands** that produce milk so mothers can nurse their young. Mammals take much better care of their young in comparison to other animals. One kind of mammal, the **marsupial**, carries its young with it in a little pouch. Most mammals give birth to live **offspring** (their young).

Mammals have a complex brain; they have skulls that protect large **cerebrums** (thinking centers). Mammals are the most intelligent animals. Man is the most intelligent mammal.

Mammals have **special teeth** depending on the type of food they eat. The shape of its teeth tells us about the food an animal eats. These teeth help the mammal digest its food quickly, thus giving it a quick energy boost. This makes mammals more active than reptiles, which are sluggish for a week or two after they swallow their prey whole.

As you can see, observers, to say a mammal is a warm-blooded, air-breathing, milk-producing vertebrate that has hair is definitely an understatement!



Name: \_\_\_\_\_ Date: \_\_\_\_\_

# What Is a Mammal?: Reinforcement Activity

To the student observer: On this worksheet, show what you know about mammals.

I. Fill in the blanks to solve the puzzle below:

M \_ \_ \_

The most complex mammal.

A \_ \_ \_ \_ \_

Mammals belong to this kingdom.

M \_ \_ \_ \_ \_ \_ \_ \_ \_

Mammals who carry their young in a pouch.

M \_ \_ \_ \_ \_ \_ \_

A gland that makes milk for newborns.

A \_ \_ \_

\_\_\_\_\_ mammals are warm-blooded.

L \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_

Most mammals give birth to \_\_\_\_\_.

II. Choose the best answer to complete the following sentences.

1. \_\_\_\_\_ show us that mammals are the \_\_\_\_\_ animals.
2. Mammal mothers \_\_\_\_\_ their young by feeding them \_\_\_\_\_.
3. The spine is made up of small bones called \_\_\_\_\_.
4. Whales are \_\_\_\_\_ since they can maintain a constant body temperature.
5. Pigs are mammals so they must have \_\_\_\_\_ on their bodies.
6. Mammals have skulls with large \_\_\_\_\_.
7. Some scientists believe \_\_\_\_\_ are the ancestors of modern mammals.
8. Mammals have become the most \_\_\_\_\_ group of animals.
9. A mammal can digest food quickly because of its \_\_\_\_\_ teeth.
10. List five main characteristics of mammals.
  - A. \_\_\_\_\_
  - B. \_\_\_\_\_
  - C. \_\_\_\_\_
  - D. \_\_\_\_\_
  - E. \_\_\_\_\_

Analyze: Why do you think mammals survived when the dinosaurs died?

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## Keeping Track: *Classification of Mammals*

Mammals, like all living things, are placed into groups, which makes it easier to study and learn about them. For example, suppose you wanted to go to the store and look for a certain CD you've been wanting. To make it easier for you to find the CD you want, the store organizes them according to the type of music, and then in alphabetical order. In the same way, all **organisms** (living things) are organized or put into groups based on the traits they have in common. Scientists look at organisms' similarities as well as their differences, which helps them to place the organisms into their proper groups. They are grouped and regrouped until every organism in the group is one of a kind. Then the group has only one species in it, and each species is given a scientific name. The name given to the organism is based on the Latin language, because Latin is the common scientific language throughout the world. In this way, scientists can keep track of the many different kinds of organisms.

**Carolus Linnaeus** developed a system of assigning every organism a name and of classifying each organism according to its system, size, shape, color, and method of obtaining food. This two-word naming system is called **binomial nomenclature** and was developed to help scientists avoid errors in communication. Binomial means "two names." The two-word species name is commonly called the organism's **scientific name**, and it is always written in italics. The scientific name is made up of the **genus** name and the **species** name. The first letter of the first word (genus name) is always capitalized, and the second word (species name) is always in lower case. An example of a scientific name is *Canis familiaris* (the dog). A specific name for every organism avoids confusion when scientists communicate because there are often too many common names for an animal, which can be misleading. For example, prairie dogs are more similar to squirrels than dogs; a starfish is not a fish, yet a seahorse is a fish.

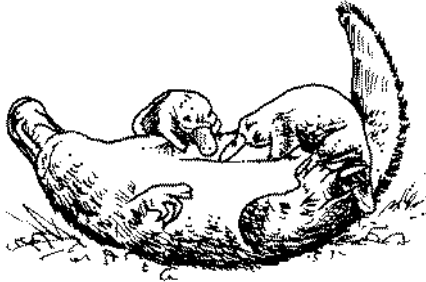
The modern classification used today is based on a five-kingdom system. These kingdoms are *Animal*, *Plant*, *Fungi*, *Protista*, and *Monera*. The science of classifying and naming organisms is called **taxonomy**. To be considered an animal, the organism must have **eukaryotic cells** (cells with a nucleus), it must have many cells, and it must be able to move about. It is not able to make its own food but must eat other organisms and digest its food.

Mammals are classified or divided into three main subclasses, according to how their young develop. The first are the **monotremes**, which lay eggs with leathery shells and incubate them. The hatchlings lick milk from the mother's skin. The duck-billed platypus is the most common monotreme. A second division is a group called **marsupials**, the pouched mammals. Pouched mammals give birth to immature offspring, which must crawl into the mother's pouch to feed and finish developing. The best known marsupial is the kangaroo. When a kangaroo is first born, it is the size of a honeybee. It has no fur and cannot see. Once developed, the little joey (a young kangaroo) crawls out of the pouch. The **placental mammals** make up the third group and largest; most mammals fall into this group. The embryo remains inside the female mammal until it is fully formed. This development time is called **gestation**. Gestation periods range from 16 days in hamsters to 650 days in elephants. The embryo develops in a saclike organ called a **placenta**. The embryo obtains food and oxygen from the mother, and its waste is removed through an umbilical cord. The **umbilical cord** attaches the embryo (the developing offspring) to the placenta, forming a connecting link between the mother and her embryo. These three divisions of mammals are just the beginning; mammals are then divided into 18 smaller groups, or **orders**.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Keeping Track: *Classification of Mammals Activity*

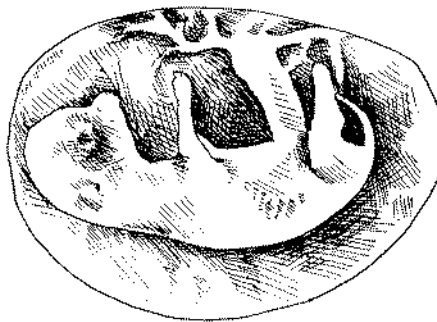
Monotreme (egg-laying mammal)



Marsupial (pouched mammal)



Placental Mammal (developing embryo)



1. Identify and explain the three ways mammals are classified.

a. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

b. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

c. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Keeping Track: ***Classification Review***

**To the student observer:** Classification puts things in their correct place. By drawing conclusions from the lesson, answer the questions below.

1. What does it mean to classify things? \_\_\_\_\_

\_\_\_\_\_

2. Why do scientists classify living things? \_\_\_\_\_

\_\_\_\_\_

3. Explain binomial nomenclature. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Who developed binomial nomenclature? \_\_\_\_\_

5. How do you write an organism's scientific name? \_\_\_\_\_

\_\_\_\_\_

6. On what language is the classification system based? \_\_\_\_\_

7. What is the science of classifying or naming organisms called? \_\_\_\_\_

8. List the five kingdoms modern classification is based on.

\_\_\_\_\_

\_\_\_\_\_

**Analyze:** Explain how you use classification in your daily life.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Using a Dichotomous Key: *Student Activity*

**To the student observer: Taxonomists** are scientists who classify. They have developed many keys that aid in the identification of organisms that may be unknown to you. Let's see if you can use a dichotomous key successfully. Good luck, observers!

A **dichotomous key** contains detailed lists of traits to help scientists classify organisms. Dichotomous keys are arranged in steps with two descriptive statements at each step. To use a key, you must always start with the first pair of descriptions. The descriptions are usually labeled as 1a and 1b, 2a and 2b, 3a and 3b, and so on. Start with description 1; from there you will see either a name of a species or directions to go on to the next set of descriptions. If you can follow the directions in the key, you have the recipe for success in finding the correct name for your species.

**Problem:** Can you follow the key to identify large native cats in the United States?

### Materials:

Paper and pencil (A pencil makes it easier to change your mind.)

Optional: Colored pencils to color the cats below

### Procedure:

1. Study the cats below and compare them to the pictures of the cats your teacher has.
2. Begin with the first pair of descriptions in the key to identify the species of Cat A.
3. Write the common and scientific name for Cat A.
4. Repeat the process to identify the species of Cat B.
5. Write the common and scientific name for Cat B.

**Cat A**

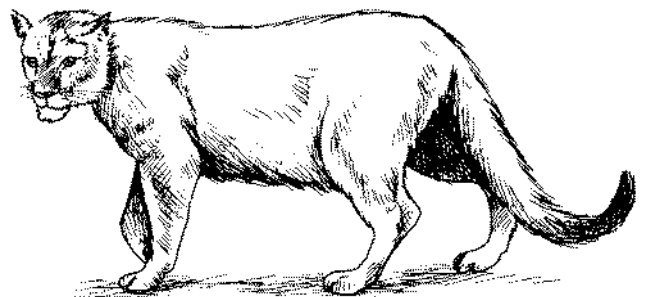


**Common name:** \_\_\_\_\_

**Scientific name:**

\_\_\_\_\_

**Cat B**



**Common name:** \_\_\_\_\_

**Scientific name:**

\_\_\_\_\_

\* **Teacher note:** Obtain a color picture of Cat A and Cat B for students to observe during the lesson.



Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Using a Dichotomous Key: *Student Activity (cont.)*

## Key to Native Cats of North America

- 1a. If the cat has a short tail ..... go to step 2
- 1b. If the cat has a long tail..... go to step 3
  
- 2a. If the cat has long ear tufts tipped with black and no cheek ruff .....*Lynx lynx* / lynx
- 2b. If the cat has indistinct spots, short ear tufts, and cheek ruff.....*Lynx rufus* / bobcat
  
- 3a. If the cat has a plainly-colored body ..... go to step 4
- 3b. If the cat has a patterned body ..... go to step 5
  
- 4a. If the cat is yellowish with white below.....*Puma concolor* / mountain lion
- 4b. If the cat is brown or black all over.....*Herpailurus yagouaroundi* / jaguarundi
  
- 5a. If the cat has a patterned body with tan and black ..... go to step 6
- 5b. If the cat has black-bordered brown spots in lines.....*Leopardus pardalis* / ocelot
  
- 6a. If the cat is large, spotted with black rings in rows.....*Panthera onca* / jaguar
- 6b. If the cat is small, with irregularly-shaped spots with four stripes on back and one on the neck .....*Felis wiedii* / margay

### Analyze:

1. According to the key, how many species of native cats live in North America? \_\_\_\_\_
  2. What was the first trait used to name the cats? \_\_\_\_\_
  3. What characteristics would scientists look at next? \_\_\_\_\_
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**Conclusion:** Explain why it wouldn't be a good idea for you to begin in the middle of this key.

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\* **Teacher Note:** You might want to extend the activity or offer extra credit by identifying the bobcat, jaguarundi, and jaguar. These three cats are also represented in the key. However, prior to the lesson, you should find a colored picture of each cat to display for students' use.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## What's the Name?: *Scientific Names*

**To the student observer:** Scientific names are used to avoid mistakes in communication. There are more than 4,500 species of mammals. Look at the list of mammals below. Using reference materials, give the scientific name for each mammal. After you have named each mammal, make an analysis from your list and answer the questions below.

1. Coyote \_\_\_\_\_
2. Dog \_\_\_\_\_
3. Fox (red) \_\_\_\_\_
4. House cat \_\_\_\_\_
5. Lion \_\_\_\_\_
6. Puma \_\_\_\_\_
7. Tiger \_\_\_\_\_
8. Wolf (gray) \_\_\_\_\_

**Analyze:** What observation can you make about your research above?

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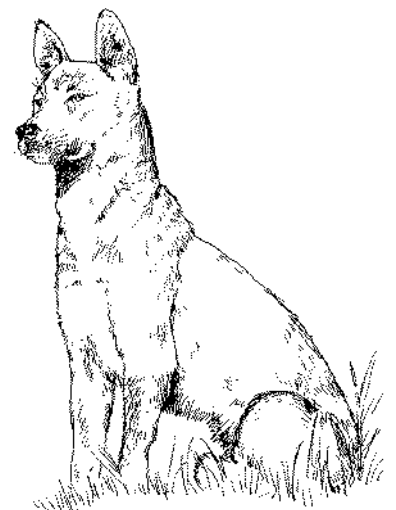


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**Conclusion:** Based on the information you collected from your research, what do you think the genus name must be for the dingo? (The dingo is a wild dog in Australia.)

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\* **Teacher note:** Provide reference materials in advance or take the students to the reference area to do research. This could be a computer lab assignment if you have one available to your students.



Name: \_\_\_\_\_ Date: \_\_\_\_\_

## How Are Organisms Named?: *Observer Journal Activities*

### ACTIVITY 1

**To the student observer:** Can you give a scientific name to a new organism? Think about the process involved and what you've learned about mammals.

**Procedure:**

1. Draw a fictitious mammal in your journal.
2. Give your mammal a scientific name.
3. Make sure your name is Latinized and infers information about the species.

**Analysis:**

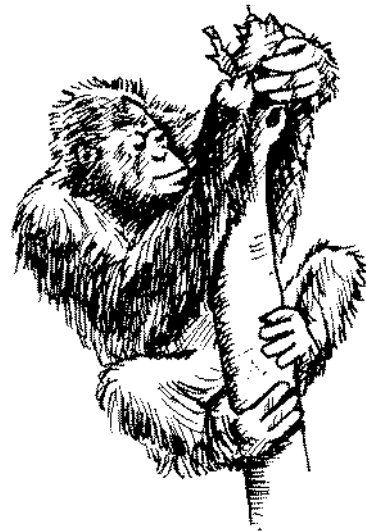
1. Present your new mammal to the class. Ask them to guess a name.
2. Why do scientists use Latin in giving organisms their names?

### ACTIVITY 2

**To the student observer:** Can you make a report in a science journal?

**Procedure:**

1. Select a field guide for mammals from your resource area. Most field guides use descriptions that lead to the identification of the animal.
2. Describe the parts of the field guide.
3. Select two mammals that, in your opinion, closely resemble each other. Compare and contrast them.
4. Use labeled diagrams if you find them helpful.



\* **Teacher note:** You will need to locate a Latin dictionary for Activity 1. Stress the importance of recording information in a journal. All budding scientists need to be observant and keep good records.