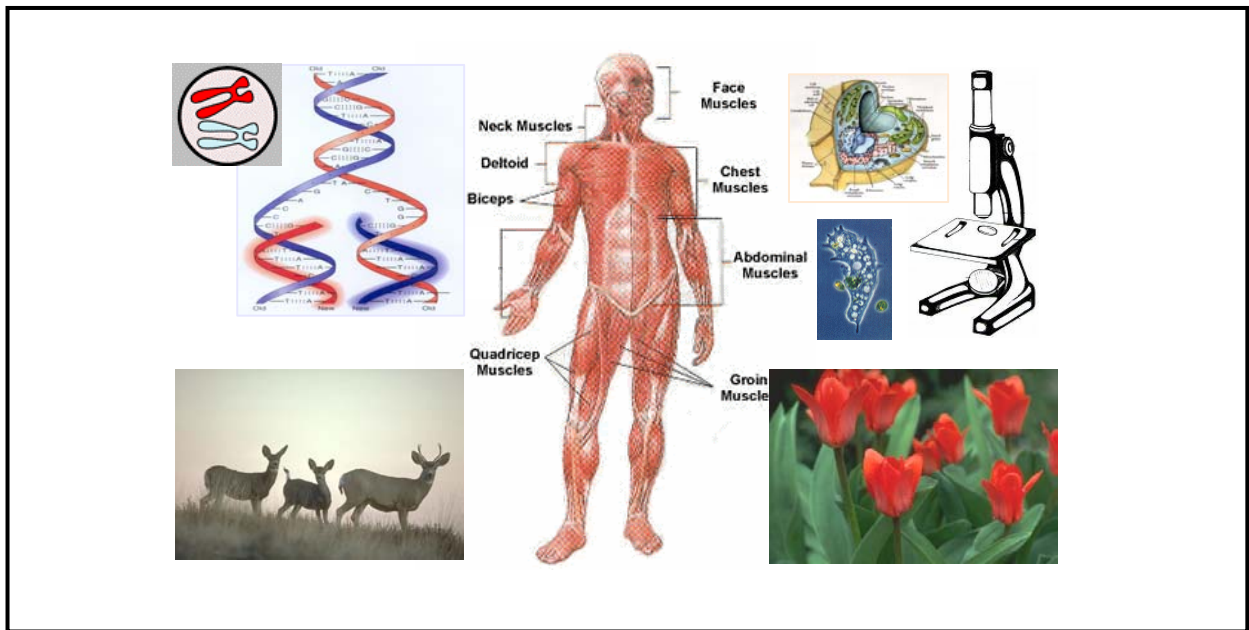


Project EASE

(Effective Alternative Secondary Education)

BIOLOGY



MODULE 18

Animals with Backbones



BUREAU OF SECONDARY EDUCATION

Department of Education
DepED Complex, Meralco Avenue
Pasig City



Module 18

Animals with Backbones



What this module is about

This is another module on animals, and this time, it deals with animals with **backbones**. Animals with backbones fall under **Phylum Chordata**. Only around 5% of all animals on earth are with backbones. Members of this phylum have **notochord**. The notochord is a structure that supports the body of a young chordate. This structure may persist only during the embryonic stage of the animal or until the adult stage. In some animals, this is replaced by the hard backbone or **vertebral column** in the adult stage.

There are 5 groups of vertebrates namely: **Pisces(Fishes)**, **Amphibia**, **Reptilia**, **Aves** and **Mammalia**. Each group or class will be discussed in separate lessons except for birds and mammals which are combined since both of them are warm-blooded animals. The lessons are as follows:

- **Lesson 1 – Pisces (Fishes)**
- **Lesson 2 – Amphibians**
- **Lesson 3 – Reptiles**
- **Lesson 4 – Birds and Mammals**



What you are expected to learn

After our discussion about animals with backbones, you are expected to:

1. Identify the major characteristics of animals with backbones.
2. Describe the characteristics of the five groups of vertebrates.
3. Identify fishes, amphibians, reptiles, birds and mammals.
4. Identify the adaptations that enable the fishes, amphibians, reptiles, birds and mammals to live in their natural habitat.
5. Distinguish among monotremes, marsupials and placental mammals.



How to learn from this module

In order to achieve the objectives of this module successfully, you have to remember the following:

1. Read and follow the instructions carefully.
2. Answer the pretest.
3. Take down notes and record points for clarification.
4. Take the posttest and check your answers with the key at the end of the module.
5. Try to obtain at least a 70% level of proficiency in the tests.



What to do before (Pretest)

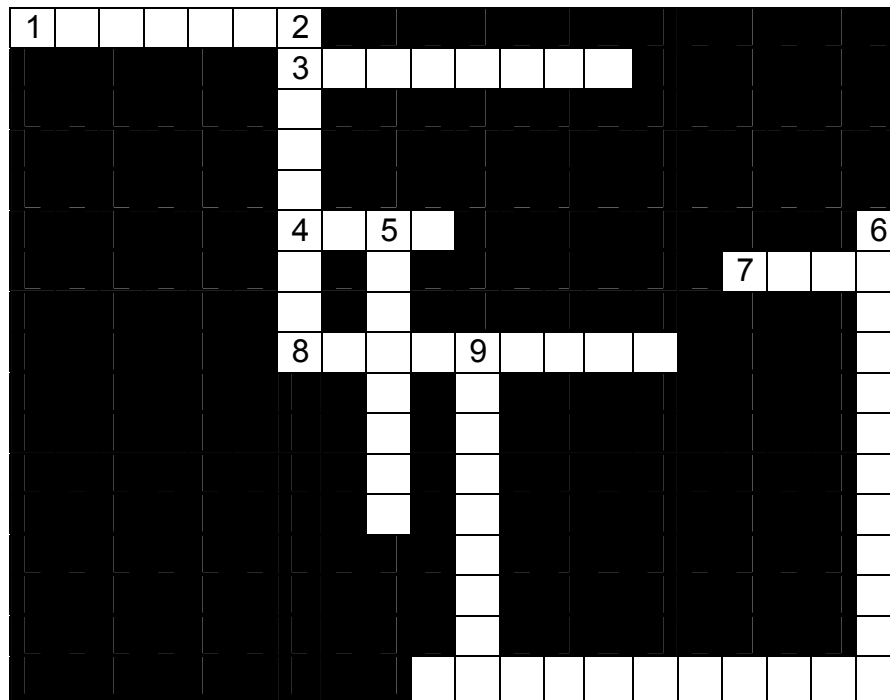
Multiple Choice. Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper.

1. Vertebrates are animals with vertebral column. Which of the following is **NOT** a vertebrate?
 - a. fish
 - b. parrot
 - c. snail
 - d. turtle
2. Cold blooded animals are those that can not regulate their body temperature. Which of the following is a cold-blooded animal?
 - a. anteater
 - b. eagle
 - c. lizard
 - d. monkey
3. Turtles live in water. Where do they lay their eggs?
 - a. deep portion of the sea
 - b. in seagrasses
 - c. pits along the sand
 - d. subtidal zone
4. In what part of the mother kangaroo does the young grow and develop?
 - a. placenta
 - b. uterus
 - c. pouch
 - d. fallopian tube
5. The following are the characteristics of amphibians **EXCEPT**:
 - a. with moist skin
 - b. can lay eggs
 - c. warm-blooded
 - d. can live both on land and water
6. Which among the following birds cannot fly?
 - a. eagle
 - b. hornbill
 - c. ostrich
 - d. owl

7. What do frogs use for gas exchange when on land?
- a. lungs
 - b. kidneys
 - c. skin
 - d. snout
8. Marsupials are animals with pouches for the young. Which of the following is a marsupial?
- a. kangaroo
 - b. lion
 - c. monkey
 - d. tiger
9. Mammals are vertebrates with mammary glands. These glands supply the young
- a. hormones
 - b. milk
 - c. salts
 - d. water
10. What part of the mother monkey is important in the development of the embryo?
- a. cervix
 - b. ovary
 - c. placenta
 - d. vagina
11. Which of this is an egg-laying mammal?
- a. koala
 - b. monkey
 - c. platypus
 - d. tarsier
12. Which of the following animals do **NOT** have scales?
- a. fishes
 - b. monkey
 - c. roosters
 - d. snakes
13. Warm-blooded animals can adapt to changes in environmental temperature. Which of the following animals is **NOT** warm-blooded?
- a. cheetah
 - b. crocodile
 - c. leopard
 - d. man
14. What part of the reptiles can be used in making leather shoes and bags?
- a. bones
 - b. claws
 - c. skin
 - d. tail
15. How many percent of all animals are vertebrates?
- a. 5%
 - b. 10%
 - c. 15%
 - d. 20%

16. Which of the following is used by frogs for gas exchange when underwater?
- a. gills
 - b. lungs
 - c. skin
 - d. All of the above
17. Which is the most diverse group of vertebrates?
- a. birds
 - b. fish
 - c. mammals
 - d. reptiles
18. To maintain normal body temperature, birds have:
- a. beak
 - b. claws
 - c. feathers
 - d. scales
19. Amphibians have limbs used for movement. How many limbs do they have?
- a. 1 pair
 - b. 2 pairs
 - c. 3 pairs
 - d. 4 pairs
20. The structure that attaches the embryo to the placenta
- a. uterus
 - b. allantois
 - c. amniotic fluid
 - d. umbilical cord

Before you start with the lesson proper, try to answer the crossword puzzle prepared for you. The puzzle is designed to check your background about animals with backbones.



CROSSWORD 1: Vertebrates

ACROSS:

1. Class of jawless fishes
3. Class of four-limbed vertebrates that produce milk to nourish their young
4. A vertebrate that has feathers and wings for forelimbs
7. Class of vertebrates with feathers
8. Rod-shaped structure that serves as the primary axial skeleton of vertebrates during embryonic development or even up to adulthood in some cases
10. Animals that have a vertebral column for axial support

DOWN:

2. An animal, such as a frog, that has naked skin and can live both in water and on land
5. Cold-blooded animals that have scaly skin
6. Class of sharks and rays
9. Substance that makes up the skeleton of sharks and rays



Key to answers on page 23.

Was it easy? If you got a perfect score, congratulations! More power as you move on!

Lesson 1. Fishes (Jawless Fishes, Jawed Fishes, Bony Fishes)

When you hear the word fishes, what is the first thing that comes into your mind? Goldfish? Milkfish? Coralline fish? Or the canned sardines in the kitchen? Well, there are more than **30,000** different species of fishes – even more than all the other species of vertebrates combined! Would you believe that 80% of all these species of fishes are found in Philippine waters? This is how rich our seas are. The richest marine habitat in our country is the **Tubbataha Reef** found in Sulu seas. It is our showcase to the world. It harbors almost all the different species of fishes in the world.

There are three groups of fishes, namely, the jawless fishes, the cartilaginous fishes and the bony fishes.

Jawless Fishes

Look at the illustration on the next page. This is a diagram of a lamprey and hagfish. They are examples of "jawless" fishes belonging to **Class Agnatha**. These jawless fishes have round mouths, and long tube-like bodies covered with slimy skin with no scales. Fishes in this class have very flexible bodies made of cartilage. A cartilage is a tough, flexible tissue not as hard as a bone. Feel your ears and the tip of your nose; these are also made of cartilage.



Hagfish



Lamprey

Figure 1. Hagfish and Lamprey

www.zoo.ufl.edu/courses/Vertzoo/lab_bonyfish2.html

www.Metafilter.com/mefi/2565

Jawless fishes do not have eyes. Most of them are found in freshwater habitat. Lampreys are examples of these. They use their round mouth with short tentacles to attach to other fish by suction. They cut into the fish with tooth-like structures and feed on its blood and body fluids. They are parasitic.

We will now proceed with the second group of fishes, the cartilaginous fishes.

Cartilaginous Fish



Stingray



Shark

Figure 2. Cartilaginous Fishes

www.beekypoo.com/LasVegas200203/imagepages/image41.htm

plusinfo.jeonju.ac.kr/photos/Animals

Are you familiar with the illustrations above? These are common in the market. Skates, sharks and rays are members of **Class chondrichthyes**. They have skeletons made up of cartilage just like the jawless fishes. Unlike jawless fish, however, chondrichthyes have movable jaws and scales. Still remember the movie, the **Jaws**? You will easily recognize these if you have watched it. This movie features how powerful the jaws/teeth of sharks are. Their scales resemble vertebrate teeth and cause their skin to feel like sand paper. Most sand papers especially in the early times were made from the skin of sharks.

Do you know ...?

... that although whales and dolphins live in water, they are not fish? They have lungs, they breathe air and are **mammals**.

Now that you are through with the jawless and cartilaginous fishes, let us move on to the bony fishes, the fishes you are most familiar with.

Bony Fish

Bony fishes make up *Class Osteichthyes*. Fishes that belong to this class have skeletons made of bones. About 95 percent of all species of fish belong to this class. Examine Figure 3 and Figure 4. These are examples of bony fishes. Figure 4 is already labeled for you. This will serve as your guide as you study the parts of the actual specimen. Are you familiar with the fish in the diagram?



Figure 3. A carp fish
www.akwafoto.aip.pl/fotoreport/krakow2/mariae.php



What you will do

Activity 1.1

1. Get a sample of a fish, preferably bangus or tilapia. Study the external parts. I'm sure you are very familiar with these vertebrates since you often see them on your dining table.
2. Starting from the anterior part, look for the **mouth**, **nostrils** (two small openings) and the two eyes.
3. Try to locate the **gills**, which are partly covered by the bony **operculum**. The operculum is a structure that closes and opens to release water from the gills. The gills are important for gas exchange.
4. Notice the presence of the **dorsal**, **pelvic**, **pectoral** and **anal fins**. All these are provided with **fin rays** that serve as support.
5. From here, you have the main body usually covered with scales in the most posterior part, which is the **tail or caudal fin**.

If you have some problems with the instructions, refer to Figure 4 showing the parts of the fish.

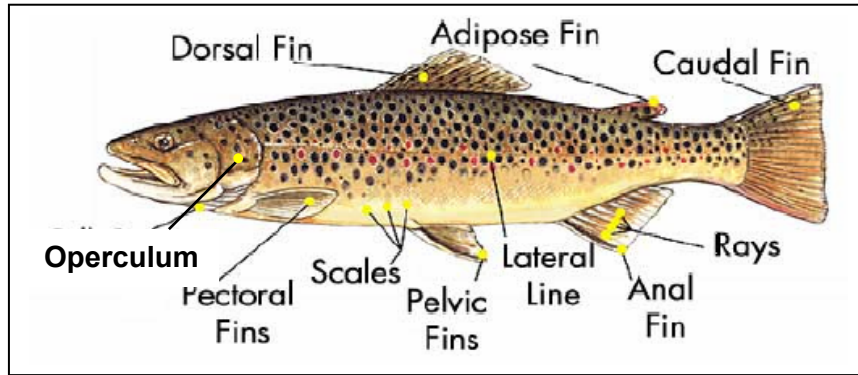


Figure 4. External Anatomy of a Bony Fish
sites.state.pa.us/Fish/education/catalog/fishpartsanswer

Answer the following:

1. Why are the gills reddish in color? What are they for?
2. How many types of fins do you see? What are they for?
3. What do you think is the use of tails in fishes?



Key to answers on page 24.

Do not forget these facts about fishes. They have:

- Skeletons made up of bones
- Bodies covered with scales
- Fins for swimming
- Gills for breathing
- Two chambered heart and are cold - blooded



What you will do

Self-Test 1.1

Matching Type. Match the phrase in column A with the item it describes in column B. Write the letters only.

A

1. Cartilaginous, jawed fish
2. Jawless fish
3. A structure used for gas exchange in fishes
4. The Greek word meaning bone
5. Helps make the fish bouyant
6. Bones that cover the gills
7. Fins used to propel the fish
8. Supports the fins in fishes
9. Cylindrical with round mouth
10. The largest group of fishes

B

- a. swim bladder
- b. gill
- c. hagfish
- d. sharks
- e. osteon
- f. ichthye
- g. bony fishes
- h. lamprey
- i. fin rays
- j. Operculum
- k. caudal or tail fin



Key to answers on page 24.

Lesson 2. The Amphibians (Frogs, Toads, Salamanders and Newts)

During rainy seasons, you might have noticed tadpoles in your pond. After a while, the tadpoles have probably metamorphosed into an adult frog. There are around 4,000 different species of amphibians in the world. These are the smallest among the vertebrates. They range from 1 cm to 170 centimeters in length.

Let's begin this lesson by doing this simple activity:



What you will do

Activity 2.1

Try this:

1. Get one frog or toad from your garden or near a riverbank. Sometimes, toads are more common than frogs. They are usually plenty during the rainy season.
2. Put your specimen in a collecting bottle and add chloroform or ether to immobilize

- your specimen or if you don't have these chemicals, you can just pith/probe the brain with a dissecting needle. This can immobilize your specimen.
3. Now study the parts. If your specimen is a toad, you might note that it has warty and rough skin, including a square-shaped skull. If it is a frog, you will note that it is smooth-skinned.
 4. Start with the head. Locate the mouth, nostrils, eyes and the round tympanic membrane for hearing.
 5. Shift to the main body mass. There are four legs attached. Hind legs are bigger since they are used for jumping. Do you find a tail?

As you locate the external parts in your specimen, you can refer to the diagram of a frog on the right. It can serve as your guide.

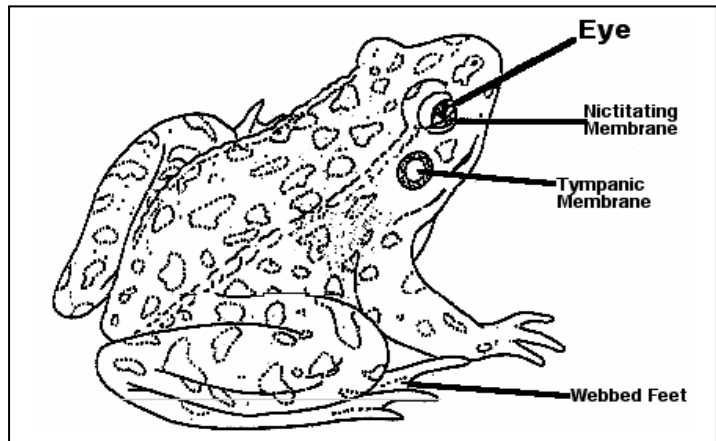


Figure 5. External Parts of the Frog
www.scchristian.pvt.k12.ia.us/bvanderb/frog.html

Frogs, toads and salamanders are amphibians. They have moist, smooth skin, or warty skin without scales. They can breathe through their skin. Oxygen and carbon dioxide can be exchanged through the skin and the lining of the mouth. Amphibians also have very small sac-like lungs in the chest cavity that are used for breathing on land. These groups of animals are also called cold-blooded which means that their body temperature changes depending on the temperature of the environment.

Do you know?

... that frogs can stay buried in the mud for several months when the temperature is very low in temperate countries? They are less active and need little amount of food. Special fat bodies keep them alive until after they can feed again in the spring.

Some frogs are poisonous while others are edible. Frogs are a delicacy in some parts of the world and even here in our country. Their skin can also be used in industries like in wallet and bag making. Some scientific researches also use frogs and frog allies like the newts in regenerating lost body parts. The studies suggest ways by which lost limbs or birth defects in humans can be remedied.

Try to answer the simple review test prepared for you. Make sure to do your best.



What you will do
Self-Test 2.1

Direction. Write the word **true** if the statement is correct, and **false** if it is incorrect.

- _____ 1. All amphibians can live both on land and in water.
- _____ 2. Amphibians are cold-blooded.
- _____ 3. Amphibians have scales.
- _____ 4. Amphibians can use their moist skin for gas exchange.
- _____ 5. The forelegs in frogs are bigger than the hind legs.



Key to answers on page 24.

Lesson 3. The Reptiles (Lizards, Snakes, Turtles and Crocodiles)

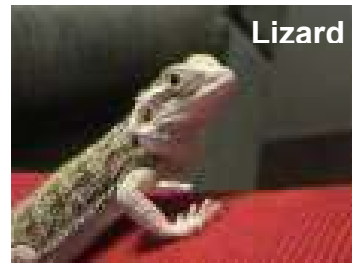
When children think of reptiles, they would probably think of dinosaurs, and other big reptiles of long ago. They always see these reptiles on television shows and magazines. However, when you think of reptiles, you will probably think of snakes moving through the grass, lizards climbing up a trunk of a tree. You may also think of a big crocodile floating noiselessly in a pool and a tortoise slowly eating a meal. All these animals are reptiles. **What are reptiles?** Reptiles are cold-blooded vertebrate with dry, scaly skin and a special type of egg adaptations that enable them to live their entire life out of water. In this lesson we will discuss reptiles in general, their characteristics and other features. Examine the diagram below showing reptilian representatives. Are you familiar with all of them?



Turtle



Snake



Lizard

Figure 6. Turtle, Snake, and Lizard
www.all-creatures.org/pics/turtles-shl-4.html
www.runningsranch.org/Lizards.html

In some ways, reptiles resemble amphibians. Both are cold-blooded which means that their body temperature depends on the temperature of their surroundings. However,

reptiles are better adapted to life on land. For example, reptilian skin is **dry and leathery** and is often covered with thick protective scales. This type of body covering helps prevent loss of body water in dry environments. The disadvantage of this type is that the tough scaly layer of skin must be changed periodically in a process called **molting**.

Turtles

Are you familiar with the animal in figure 7? It is a sea turtle locally known as **pawikan**. Do you know how turtles differ from a tortoise? Well, **turtles** are found or live in water, while **tortoise** live on land. Do you know that the meat of a sea turtle is edible? It is considered a delicacy in the coastal towns of Cebu, Sulu and Eastern Luzon where it is found. However, eating turtle meat is discouraged since the animal is near to extinction.



Figure 7. A sea turtle
diskusjonsforum.no/akvariet/printthread.php?t=12317

Do you know?

... why sea turtles leave the water to lay their eggs on land? It is because they can't get oxygen from the water the way fish can. Once their eggs are laid, they never come to see them again!

If the eggs hatch in water, the baby turtles would drown right away. In fact, if a sea turtle were to lay her eggs in the sea, the turtles would die even before they could hatch. That would happen because even the eggs needed air to breathe.

Turtles make up a very successful order of animals. They can be found in almost every continent and in most of the world's oceans. The body of a turtle is covered by a hard shell both on top and at the bottom. Most turtles can withdraw into their shell for protection. Turtles have no teeth and use their beaks to feed on insects, worms, fish and plants. So, do not be afraid of the turtles. Remember they do not have teeth and they don't bite!

You will now proceed to the next group, the lizards and snakes.

Lizards and Snakes

Go back to the illustration of the different reptiles. Do you see the snakes and lizards? Snakes and lizards make up the largest group of reptiles. If you are not familiar with them, find a means to see the actual specimens of these animals. You can see them

placed in natural museums or live in Zoos and other reserved areas. Some are sold in pet shops although selling of lizards and snakes is supposedly banned now.

Do you know?

... that snake oils are used as medicine? ANCROD is an ingredient in the venom of pit vipers being studied as a possible medicine to prevent human stroke. ANCROD is a substance that stops blood from clotting. Doctors say that a correct dosage of ANCROD can prevent the damage of strokes caused by blood clots that block blood vessels in the brain of man. The venom is collected from the snakes by pressing their jaw against the container.

Are you afraid of snakes? Many people are. Maybe this is because some snakes, such as rattle snakes are poisonous and dangerous. But most snakes are not poisonous. In fact snakes are helpful to humans because they eat pests like insects, rats and mice. Snakes are meat eaters. They do not have legs, eyelids and external ears. Some snakes wrap around and trap their prey. Others inject their prey with poison venom. Many snakes feed on rodents like rats and help control their populations.

The last group of reptiles that we are going to discuss are the crocodiles.

Crocodiles

Look at the illustration on the right. Are you familiar with crocodiles? Have you seen one? If so, where? Were you frightened? In Manila zoo we have several specimens of live crocodiles. In Palawan, there is already a ***crocodile farm*** found in Puerto Princessa. The purpose of this farm is to protect the crocodiles and increase their number. Crocodiles and alligators are among the world's largest living reptiles. They are carnivorous and some species can grow up to 7 meters in length with a mass of around **1,000** kilograms. These animals live mostly in the tropics where the climate remains warm the whole year round. Crocodiles have long, slender snouts and are very aggressive.



Figure 7. A Crocodile
the-i.org/pic_fauna/08



What you will do
Activity 3.1

Go to the nearest **zoo** in your place and try to be familiar with all the reptiles and other vertebrates found in the zoo.

Try to interview a caretaker of the animals. Ask him how they maintain the zoo, e.g. foods given to the animals, cleanliness of the surroundings and other informations you would like to ask. How many groups of vertebrates are familiar to you? Are all the classes of vertebrates represented in the zoo? Take note of the sexes.

Answer the following questions:

1. What do you think is the importance of knowing the sexes of the different animals?
2. Why are zoos important to bioconservation?



Key to answers on page 24.



What you will do
Self-Test 3.1

Direction. True or false. Write the word **True** if the statement is correct and **False** if it is incorrect.

- _____ 1. Most reptiles molt.
- _____ 2. Turtles live on land.
- _____ 3. Reptiles have tough leathery skin.
- _____ 4. Turtles lay eggs.
- _____ 5. A famous crocodile farm is found in Marikina.
- _____ 6. The biggest of all reptiles are the crocodiles and alligators.
- _____ 7. Reptiles do not have scales.
- _____ 8. Reptiles are cold - blooded.
- _____ 9. Turtles bite.
- _____ 10. Some forms of medicine can be derived from snakes.



Key to answers on page 24.

Lesson 4. Birds and Mammals (Warm-blooded animals)

In this lesson, we will study the last group of vertebrates, the *warm-blooded* vertebrates. Unlike cold-blooded amphibians and reptiles, *birds* and *mammals* are warm-blooded which means that they are able to maintain a constant body temperature. This is one reason why they can stay active most of the time. This characteristic helps you to see birds and mammals all year round. These two groups of vertebrates will be our topic in this lesson. We will first start with the birds, followed by the mammals, the highest form of vertebrate.

Birds

So far, you have probably seen different kinds of birds. Colorful birds fill the woods and your backyard. Exotic birds with colorful feathers live in zoological gardens. Yes, there are many birds. About 8,700 living species are living today and more than 100,000 different species have already been extinct.

What is a bird? A bird is a warm-blooded animal with an outer covering of feathers, two legs used for walking or perching, and front limbs modified into wings. A bird's body temperature is about 40 degrees centigrade. Comparatively speaking, they have higher body temperature than the human body. The most striking characteristic of birds is the presence of feathers. They are the only members of the animal kingdom with feathers. They also have wings for flight that gives them a big advantage over the other groups of vertebrates. However, not all birds can fly. The ostrich, for instance, cannot fly. Its body is too heavy to fly. It has well-developed legs for running and it runs like a horse. The penguin does not fly too! Their forelimbs are modified as paddles for swimming.

Do you know?

... that almost half of the world's birds migrate? The Philippine migratory birds can travel from our country to Siberia, USSR, and back to our country during wintertime?

Tern migratory birds leave its birthplace, the North Pole, and travels all the way down the South Pole covering nearly 38,623 km. where it is summer time.

Although you are already familiar with birds, try to take a closer look at the illustration of the external parts of a bird on the next page. Are you familiar with all the parts? Well, if you have pet birds I'm sure you are very familiar with the parts.

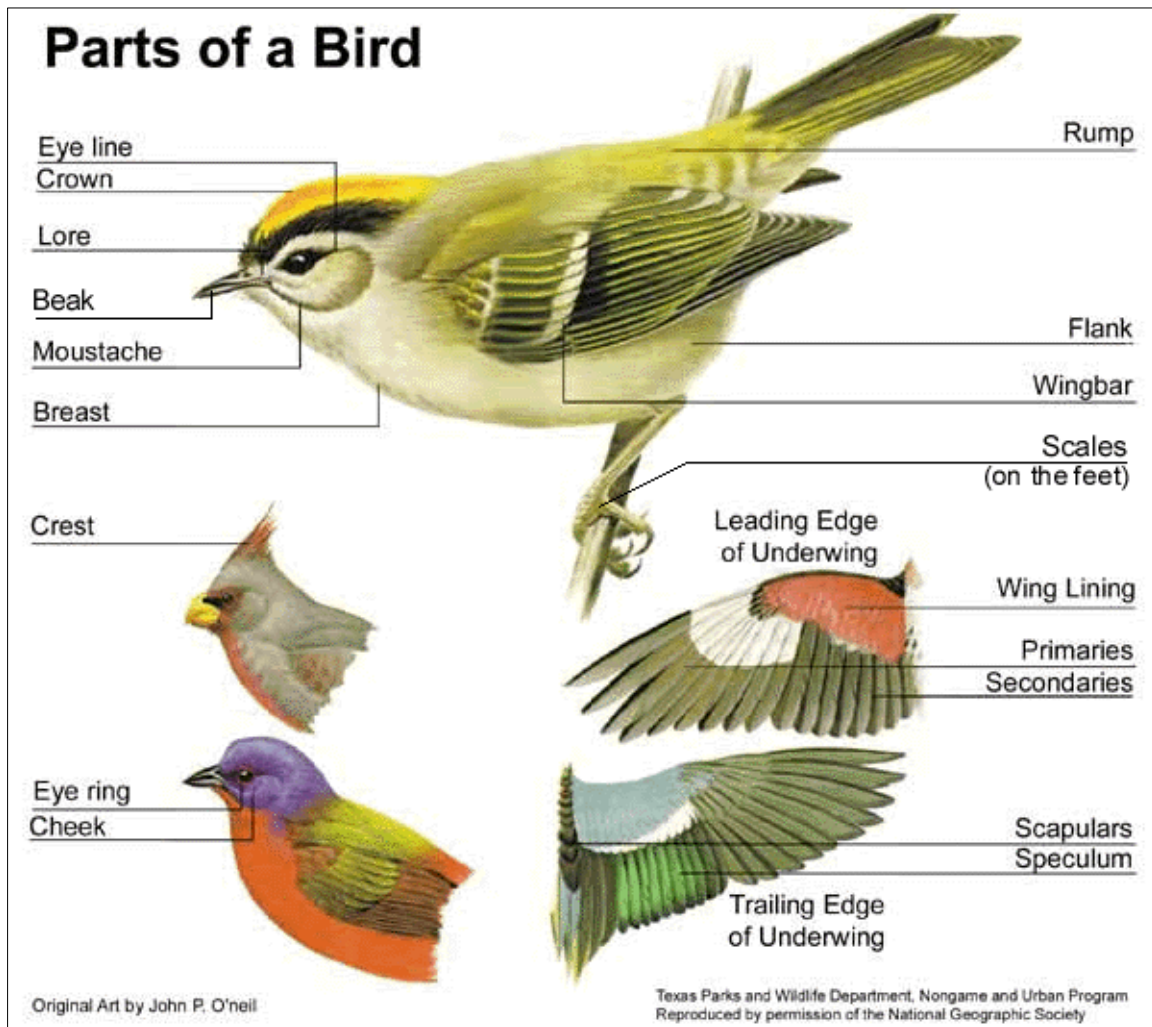


Figure 8. External Parts of a Bird

http://www.4to40.com/images/earth/geography/birds/birds_body_parts.jpg

What other features do these vertebrates possess? Notice that they also have **scales** especially on their feet. Another common feature is the **beak** or bill. Beaks in birds vary depending on the nature of the food that they eat. They could be modified for cracking seeds, boring holes to the trunks of trees and picking worms. The beak is the part that they use for feeding.



What you will do

Self-Test 4.1

1. What are warm-blooded animals?
2. Enumerate the striking characteristics of birds.
3. What are migratory birds?



Key to answers on page 25.

Mammals

Recall the vertebrates that you studied in the zoo. Does your list include the same animals listed below?

elephant	deer	rhinoceros	tiger
giraffe	monkey	urang-otang	wild boar
lions	leopard	armadillo	zebra

All the vertebrates in the list are mammals. This word came from the Greek word **mamma** meaning **breast**. Mammals are animals with mammary glands. In most mammals, the female mammary gland secretes milk when she feeds her young. Mammals are animals that are covered with hair or fur. They are warm blooded, and their body temperature is stable; it does not change with temperature changes in the environment. There are about **5,000** species of mammals, some 230 of which are found in our country. Our country has one of the richest variety of animals including wildlife. Many of these, however, are endangered.

Let us now discuss the different groups of mammals. There are three of them, the egg laying mammals or **monotremes**, **marsupials**, and the **placental** mammals.

Egg- laying Mammals

The montremes are a small group of mammals that lay eggs. All the other baby mammals are born and not hatched from an egg. Examples of monotremes are the **Platypus** and the **spiny anteater**. Study the illustrations below. These are examples of egg-laying mammals. They do not have nipples like the placental mammals and the marsupials but the young licks milk from the skin and hair surrounding the female's mammary gland.

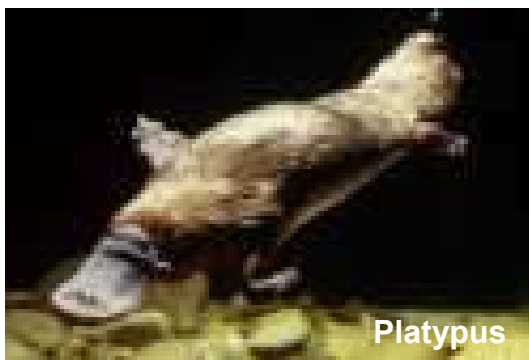


Figure 9. Platypus and Spiny Anteater
www.lifemeandering.com/archive/comic13.htm
www.windows.ucar.edu/tour/link=/.../windo

The next group that we will discuss are the mammals with pouches. These are called **marsupials**.

Mammals with Pouches

This second group of mammals develop their young in pouches, but the youngs are born, not hatched from eggs. These mammals are the **marsupials**, which are common in Australia and New Zealand. Look at the illustration below. What is so striking with this group of mammals?

The young marsupial develops for a short while inside the body of the mother. When they are born, they are tiny and helpless. The new born kangaroo weighs less than 28 grams. It is no bigger than your thumb. The tiny marsupial crawls through its mothers hairs or fur to her pouch. There it attaches itself to the mother's mammary gland. It feeds on milk until it is strong enough to leave the pouch. The baby kangaroo stays in the pouch for nine months. This is interesting, isn't it?



Figure 10. A Kangaroo
www.photos-animaux.com/race-704-ANG.html

Mammals with Placenta

This is the largest group of mammals. We belong to this group. These are mammals whose embryo develops inside the placenta. The placenta is a special organ inside the mother's womb. Because of this placenta, the baby can stay inside the mother longer. When they are finally born, a baby placental mammal is more developed and active than other new born mammals.

Have you heard?

... that whales are mammals but they have very little hair and few bristles around their lips? They are considered as the largest mammals on earth!

Examine the diagrams on the next page. I'm sure you are very familiar with these animals. These are mammals including man. Marine mammals such as whales and dolphins are not included in the picture.

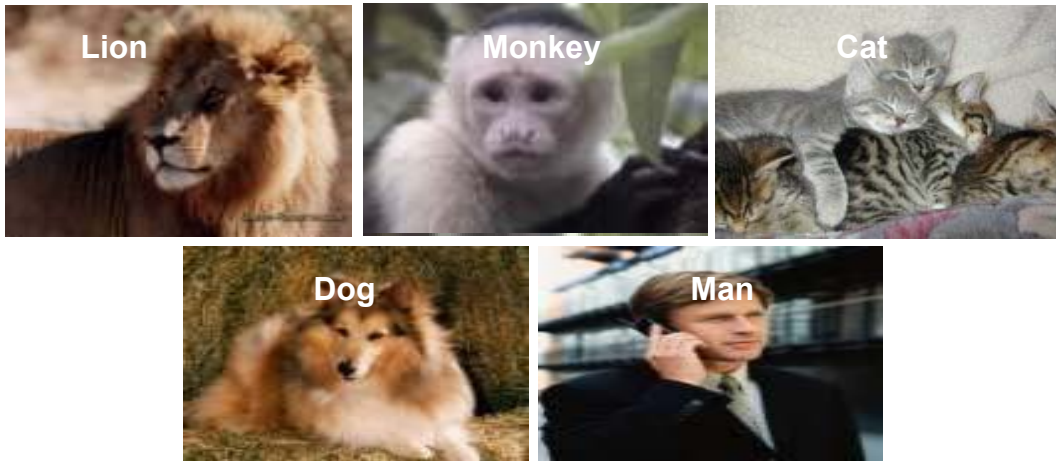


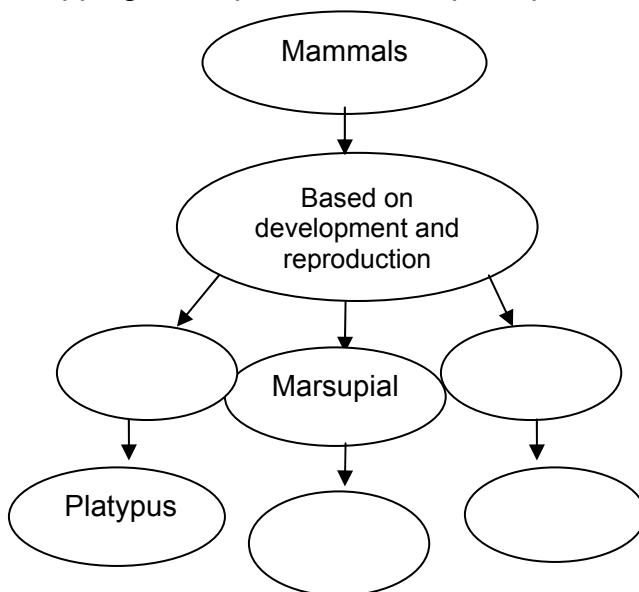
Figure 11. Placental Mammals
www.game-reserve.com/lion_ www.monteverdeinfo.com/white-
www.safelyinvest.com/OLD%20FILES/keyman.htm


In placental mammals, the **embryos** develop inside the female organ, the **uterus**. The time during which the embryo develops in the uterus is called as the **gestation period**. The **gestation** period ranges from 16 days to 650 days in elephants. Placental mammals are named after the **placenta**, the organ developed by the growing embryo that is attached to the uterus. An **umbilical cord** attaches the embryo to the placenta.



What you will do
Self-Test 4.2

Concept Mapping: Complete the concept map describing the groups of mammals.



 **Key to answers on page 25.**

This time compare your answer with the answers on page 25. If your answers are different its ok, anyway you can have different answers for the examples asked.



Let's Summarize

1. Fishes are aquatic vertebrates that are characterized by scales, fins and gills.
2. There are around 30,000 different species of fish.
3. There are three groups of fishes, the jawless fish, the cartilaginous jawed fishes and the bony fishes.
4. The jawless fish is considered the most primitive type. This is represented by the hagfishes and the lampreys.
5. The jawed, cartilaginous type is represented by the sharks and stingrays.
6. The bony fishes include those that you eat almost every day. These are provided with a bony exoskeleton and endoskeleton. They belong to the more advance group of fishes.
7. Amphibians are vertebrates that are aquatic as larvae and terrestrial as adults. They breathe with their lungs as adults, and have a moist skin that contains many glands.
8. Amphibians include the frogs, toads, newts and salamander.
9. Amphibians can live on land and in water. They use their skin for gas exchange under water and their lungs when on land.
10. Reptiles are cold-blooded animals.
11. There are around 6,000 different species of reptiles in the world.
12. Class reptilia is composed of lizards and snakes, turtles, crocodiles and alligators.
13. Crocodiles are the largest reptiles, weighing around 1,000 kilograms.
14. Some snakes secrete venom which are poisonous to other animals.
15. A crocodile farm is found in Puerto Princessa, Palawan.
16. Reptiles use their lungs for gas exchange. They have thick and leathery skin that can withstand drying up.
17. Several species of our wild life are endangered by extinction.
18. Birds are the only vertebrates with feathers. They also have claws and scales.
19. Birds are warm blooded vertebrates that are capable of flying.
20. They have a pair of wings they use for flight.
21. Mammals are warm blooded vertebrates that have hair and produce milk to feed their young.
22. All mammals reproduce sexually.
23. Mammals are classified into three: the placental, marsupials and the monotremes.
24. The placental mammals have embryos that develop inside the female organ called the uterus.
25. The time during which the embryo develops in the uterus is called the gestation period.
26. Marsupials are pouched animals that give birth to tiny, immature offspring.

At last you are through with the last module on animals. Now let us see how much you have learned from this module. Go on and answer the posttest below.



Posttest

Multiple Choice. Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper.

- To maintain normal body temperature, birds have:
 - beak
 - claws
 - feathers
 - scales
- The class where jawless fishes belong:
 - Class Amphibia
 - Class Agnatha
 - Class Osteichthyes
 - Class Chondrichthyes
- What part of the mother monkey is important in the development of the embryo?
 - cervix
 - ovary
 - placenta
 - vagina
- Vertebrates are animals with vertebral column. Which of the following is **NOT** a vertebrate?
 - fish
 - parrot
 - snail
 - turtle
- Cold - blooded animals are those that cannot regulate their body temperature. Which of the following is a cold-blooded animal?
 - eagle
 - lizard
 - monkey
 - snake
- Which of the following is a cartilaginous fish?
 - bangus
 - catfish
 - stingray
 - tilapia
- The following are the characteristics of reptiles **EXCEPT**:
 - cold-blooded
 - dry scaly skin
 - with mammary glands
 - lay eggs with leathery shell
- The following are the characteristics of amphibians **EXCEPT**:
 - moist skin
 - can lay eggs
 - warm – blooded
 - can live both on land and water
- Animals can do all of the following **EXCEPT**:
 - grow
 - reproduce

- b. move
- d. produce its own food
10. The organ that attaches the fetus to the uterus is called as:
a. allantois
b. ammoniotic bag
c. placenta
d. umbilical cord
11. Some mammals lay eggs, and the young suck milk from the mother's mammary glands. Which among these mammals are egg laying?
a. anteater
b. donkey
c. kangaroo
d. koala
12. All of the following vertebrates have scales **EXCEPT**:
a. crocodiles
b. fish
c. monkey
d. turtles
13. The breathing organ found in fishes is the:
a. gills
b. lungs
c. scales
d. skin
14. Warm-blooded animals can adapt to changes in environmental temperature. Which of the following animals is **NOT** warm-blooded?
a. cheetah
b. leopard
c. man
d. salamanders
15. The main feature of birds that makes it different from other vertebrates is
a. claws
b. feathers
c. scale
d. vertebrae
16. What percent of all animals are vertebrates?
a. 5%
b. 10%
c. 15%
d. 20%
17. In order to be considered a vertebrate, an animal must possess:
a. gills
b. heart
c. lungs
d. notochord
18. Which of the following is used by adult frogs for gas exchange when underwater?
a. gills
b. lungs
c. skin
d. All of the above
19. Which is the most diverse group of vertebrates?
a. birds
b. fish
c. mammals
d. reptiles
20. Amphibians have limbs used for movement. How many limbs do they have?
a. 1 pair
b. 2 pairs
c. 3 pairs
d. 4 pairs



Key to answers on page 25.



Key to Answers

Pretest

- | | | | |
|------|-------|-------|-------|
| 1. c | 6. c | 11. c | 16. c |
| 2. c | 7. a | 12. c | 17. b |
| 3. c | 8. a | 13. b | 18. c |
| 4. c | 9. b | 14. c | 19. b |
| 5. c | 10. c | 15. a | 20. d |

Crossword puzzle:

A	G	N	A	T	H	A														
						M	A	M	M	A	L	I	A							
						P														
						H														
						I														
						B	I	R	D											O
						I		E								A	V	E	S	
						A		P												T
						N	O	T	O	C	H	O	R	D						E
								I		A										I
								L		R										C
								E		T										H
								S		I										T
										L										H
										A										Y
										G										E
										V	E	R	T	E	B	R	A	T	E	S

Lesson 1

Activity 1.1

Answer the following questions:

1. The gills of fishes are usually reddish in color since these are highly supplied with blood vessels. These blood vessels carry non-oxygenated blood to the gills for gas exchange.
2. There are four types of fins - the dorsal, pelvic, anal and tail fins. They help the fish in balancing and swimming.
3. The large tail fins move back and forth to propel the fish through the water.

Self-Test 1.1

- | | |
|------|-------|
| 1. d | 6. j |
| 2. c | 7. k |
| 3. b | 8. l |
| 4. e | 9. h |
| 5. a | 10. g |

Lesson 2

Self-Test 2.1

1. True
2. True
3. False
4. True
5. False

Lesson 3

Activity 3.1

1. The sexes are important for conservation purposes.
2. They are important since they are considered as *ex situ* conservation sites where animals are being taken cared of, in order to increase their number.

Self-Test 3.1

- | | |
|----------|----------|
| 1. True | 6. True |
| 2. False | 7. False |
| 3. True | 8. True |
| 4. True | 9. False |
| 5. False | 10. True |

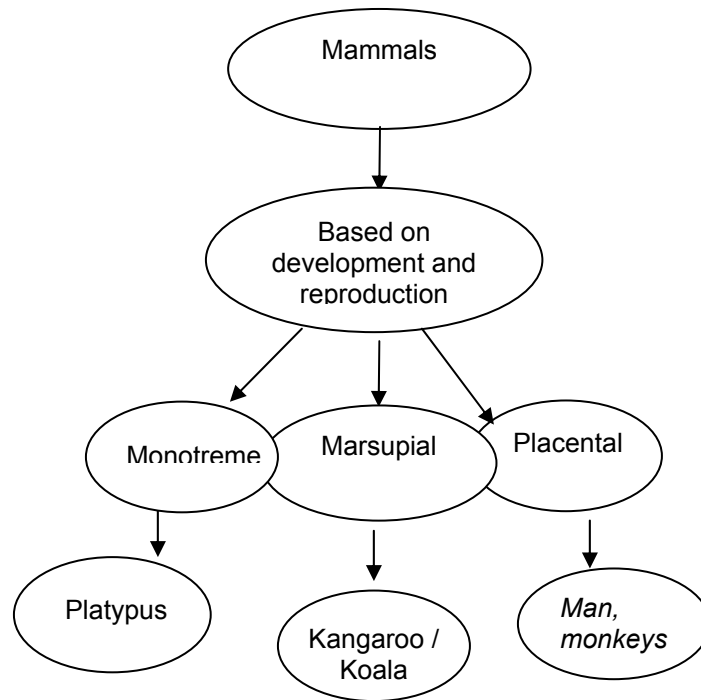
Lesson 4

Self-Test 4.1

1. Warm-blooded animals are those that can regulate their body temperature regardless of the environment.
2. Birds are animals with feathers, beak and scales. Most of them are capable of flight.
3. Migratory birds are those that are capable of long flight across miles for a specific purpose.

Self-Test 4.2

Concept Mapping



Posttest

- | | | | |
|------|-------|-------|-------|
| 1. c | 6. c | 11. a | 16. a |
| 2. b | 7. c | 12. c | 17. d |
| 3. c | 8. c | 13. a | 18. c |
| 4. c | 9. d | 14. d | 19. b |
| 5. b | 10. d | 15. b | 20. b |

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