

# Create an Animal

**Subject:** Science, Art, Composition

**Duration:** 1-2 hours

**Location:** Classroom

## **Next Generation Florida Sunshine State Standards:**

The student understands the process and importance of Genetic diversity. (SC.F.2.3)

The student understands the competitive, Interdependent, cyclic nature of living things in the Environment. (SC.G.1.3)

**Objectives.** The students will be able to:

- A.) List the classification and ranking system for life. (KPCOFGS)
- B.) Create their own fictional animal.
- C.) Explain how their animal's unique adaptations help it survive.

**Method.** Students will win pieces of animals by answering trivia questions about animal's classification and adaptations. When every group has a "head" "body" and "feet" section of animal, they will complete a worksheet and draw their new animal and present it to the class.

**Background.** Animals are adapted to their environment to survive. By learning about different animal's adaptations, and the scientific method of classification of animals, students will be able to create their own animal with a variety of different animal adaptations combined into a new super animal.

**Materials:** Animal skins, skulls, and feet from the museum. Create an animal worksheet. Crayons and paper to draw their animal. Laminated cards explaining life classification.

**Suggested Procedure:** Have students sit at tables in their tent groups. Explain the Background Information\* to the group, and that they will be creating a new animal that doesn't actually exist on this planet, and that they will use the scientific naming process to name their animal. Explain the classifications of life, and how each animal they create will be in the Kingdom of Animalia, Phylum of Cordata, (spinal cord), but they will choose the class, (Mamalia, Reptilia, Amphibia, Aves (bird), or Fish. Each tent group will compete against the other tent groups to win the first choice on animal parts.

# Create an Animal

1. What is your animal's scientific name?

<b><u>Class</u></b> Mamalia Reptilia Amphibia Aves Fish
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Example:

Animilia | Cordata | Mamalia | Carnivora | Felidae | Puma | Puma concolor

<b>Animalia</b>	<b>Cordata</b>						
Kingdom	Phylum	Class	Order	Family	Genus	Species	

2. What is your animal's common name?

3. Is your animal, nocturnal, diurnal, or crepuscular?

4. What does your animal eat?

5. What is your animals most important sense, and why?

6. What special adaptations does your animal have to help it survive?

7. Extra Credit, What is the common name of the animal in the example of question #1.

Draw your Animal Here.

## Background Information\*

The earth is populated with a tremendous variety of animal life. In a process called classification, scientists organize the incredible diversity of animal life into a manageable body of knowledge that allows for systematic study. When scientists classify animals, they sort them into groups, on the basis of similarities and differences in physical structure, biochemistry, genetic composition, and other factors.

In this program we will discuss a system in which animals are classified into seven groups, from kingdom to species. As one goes from kingdom to species, the animals in a group are more closely related. For instance, although these animals appear to be radically different from each other, they share certain physical and structural characteristics. These similarities have prompted scientists to classify all three into the phylum Chordata, which contains fish, amphibians, reptiles, birds, and mammals, generally considered by scientists to be complex.

One of the primary characteristics of the members of this group of animals known as chordates is the existence of an internal supporting rod of connective tissue. This rod of connective tissue is called a notochord. In most chordates, the notochord is only present during the earliest, or embryonic, stage of development, as seen here in this frog tadpole.

A second major characteristic of all chordates is the existence of a tubular nerve cord that runs along the top, or dorsal side of the body, as, for example, the spinal column that runs along the back of each human being.

A third important characteristic of chordates is paired gill slits, which often as in the case of humans, exist only in the embryonic stage of development before changing into human structures. However, certain animals, such as fish, never develop an organ for breathing beyond gill slits.

The members of the phylum Chordata with which we are most familiar are those further classified into the subphylum Vertebrata. In all vertebrates the notochord is replaced during the embryonic stage by a column of bone or cartilage, the backbone. Vertebrates also possess a skull that protects the brain. Vertebrate skulls house the sensory organs for taste, smell, hearing, and vision. Most vertebrates have two pairs of appendages which can take the form of wings, flippers, fins, arms, or legs.

Externally, vertebrates are covered with a double layer of tissue. The external layer, or epidermis, can produce scales, as is often the case in reptiles and fish; feathers, which are a common feature of birds; or hair, which is found on a variety of animals like seals and horses, not to mention humans.

**Amphibians** - Another group of vertebrates are the members of the class Amphibia. The word Amphibia means "double lives." They live both on land and in the water. Amphibians are cold-blooded animals with a three-chambered heart as well as other organs commonly found in most vertebrates. Typical examples of amphibians are frogs, toads, and salamanders. Most amphibians have soft, smooth skin, which is kept moist by mucous glands. Some, however, such as the toad, have dry, bumpy skin.

Amphibians absorb oxygen into their bodies through their skin. Amphibians also have lungs, which are used in respiration, but they are not as highly developed as those of the higher vertebrates. Amphibians usually live in damp places, which helps to keep their skin from drying out. In order to mate successfully, amphibians must be in a watery environment. Most amphibians are oviparous. They develop from eggs hatched outside them other. Amphibian eggs can be found in the spring and early summer as clumps of jelly-like masses laid in freshwater. Amphibian eggs, such as the frog egg shown here, undergo many cell divisions. In time they will develop into fishlike larvae called tadpoles. In their younger stages, tadpoles use gills for respiration.

As an amphibian's limbs begin to develop and the tail disappears, the respiratory function of the gills is replaced by the lungs. Still, some salamanders retain external gills as adults. Upon the completion of its metamorphosis, a tadpole is transformed into an adult frog, capable of life not only in water but also on land. This capability is a step of great evolutionary importance. The tadpole's chief food is vegetable matter. Upon becoming frogs, they most often feed on animals such as these dragonflies, which they capture with their long, sticky tongues.

Amphibians protect themselves by quickly scurrying away from danger. Some amphibians also have foul-tasting or poisonous skin that serves to deter predators. In terms of evolution, the classes containing fish and amphibians are some of the simplest vertebrates in the phylum Chordata. And yet these animals exist in a wide array of beautiful shapes and colours, and comprise an essential part of the network of all living things. Other members of the subphylum Vertebrata include birds in the class Aves, reptiles in the class Reptilia, and mammals in the class Mammalia. These animals breathe exclusively through the use of well-developed lungs, rather than through the use of gill slits, as do fish, or through their skin, as do amphibians.

**Birds** - Birds, which are in the class Aves, are evolutionarily linked to reptiles. Notice the scales on this bird's legs. Looking at the extinct Archaeopteryx, which exists today only in fossil form, we can perhaps see the way certain physical characteristics from each group have been merged. Feathers, which come in all shapes, sizes, and colours, are certainly an important distinguishing characteristic of birds. Feathers serve many useful purposes, including insulation for the body and protection from moisture. Their special coloration may be useful for concealment or for attracting a mate.

Like mammals, birds are warm-blooded. The temperature of a bird's body remains the same regardless of the surrounding air temperature. Birds must consume a great deal of food to maintain their body temperature, which is slightly higher than that possessed by mammals. Birds have a highly efficient respiratory system and a fast beating, four-chambered heart.

Most birds are capable of flight, although a few, such as the ostrich and penguin, do not now have this ability. It is interesting to examine the adaptation that birds have undergone in order to fly. As their forelimbs have developed into wings, large chest muscles have developed which originate at the keel of the breastbone. Many of a bird's bones are hollow and lightweight. Their bodies are also streamlined to avoid wind drag while in flight. The tail has also been modified for flight and is used for steering, braking, balancing, and lift-off.

In addition to flying, birds have adapted in other ways to serve other purposes. For instance, rear legs are used for walking, and the feet have adapted to serve purposes such as paddling, perching, wading, and tearing the flesh of prey. Because birds have no teeth, their beaks have undergone certain modifications required for survival. Some beaks are used for ripping flesh, some for cracking seeds, and some for boring in wood or capturing fish. Birds can communicate through a variety of songs and calls that are produced through a unique organ in their throat called a syrinx.

Birds have other unique characteristics as well. Birds are oviparous and lay eggs with brittle shells which must be incubated while they develop. Most young birds require parental care until they are old enough to fly and get their own food. Birds have keen eyesight, which is helpful in protection and in obtaining food, such as small animals and insects. Some birds, such as vultures, are scavengers, meaning they prey upon dead or decaying matter.

**Fish** - Fish and amphibians are vertebrates with special characteristics that allow them to spend all or part of their lives in water. There are two classes of fish in the subphylum Vertebrata.

The first of these classes contains sharks, rays, and skates and is called class Chondrichthyes, the cartilage fish. Members of this class do not have bone in their skeletons. Instead, they have skeletons of rubbery cartilage.

The second class of fish are those with bony skeletons. These are members of the class Osteichthyes, and include most of the fish familiar to you, such as salmon and trout.

Many fish have a body shape that easily facilitates movement through the water. The tail is a chief "organ" of locomotion, while the fins are used to steer, swim, and maintain balance. Overlapping scales cover the bodies of most fish, although some fish, like sharks, have a rough leathery skin. Special organs called gills enable fish to obtain oxygen dissolved in the water. In most fish the gills are protected by covers called opercula. When water enters a fish's mouth, it passes over the gills where tiny blood vessels absorb oxygen from the water and release carbon dioxide into it. Water is then expelled through the gill slits.

The internal organs of fish are more highly developed than those of invertebrates, animals without a notochord, dorsal spinal cord, or gill slits. For instance, fish have a two-chambered heart, a liver, and, in many cases, an air bladder, which is used to regulate depth. Another characteristic of most fish is that their body temperature is similar to the water they live in; thus we call fish cold-blooded animals. Most fish are oviparous, or egg-laying. The female lays eggs in the water where they are fertilized and left to hatch. Certain sharks are ovoviviparous. This means their eggs remain within the mother's body until they hatch into baby fish, after which they are "born." Fish eat plant material as well as other aquatic animals. They even eat one another.

**Mammals** - Along with the fish, amphibians, reptiles, and birds we've already looked at, mammals are also classified as vertebrate members of the phylum Chordata. The giraffe is one of a variety of species that belong to the phylum Chordata, class Mammalia. Because of their refined nervous and reproductive systems, mammals are generally considered the most advanced members of the animal kingdom. After they are born, mammals are nourished with milk secreted by the mammary glands of their mothers. It is for this unique characteristic that mammals are named.

A second characteristic of mammals is that they possess hair that can cover all or part of their bodies. Most mammals are viviparous. This means that mammalian young develop inside the mother's body rather than outside, such as in an egg. Mammalian offspring

are born in a form resembling an adult.

Some subclasses of mammals give birth to their offspring by other means. The rarest are the monotremes, or egg-laying mammals, which includes the platypus and the species known as echidna, or spiny anteater. Another subclass includes the marsupials or pouched mammals such as the kangaroo and opossum. Marsupial offspring are born in an undeveloped state and spend the last period of development inside the mother's pouch, where the mammary glands are located.

All members of the class Mammalia are warm-blooded and are able to maintain a fairly constant body temperature. All mammals are fundamentally alike in body structure. Special characteristics include a well-developed brain, a four-chambered heart, and a muscular diaphragm that separates the abdominal and thoracic cavities. Most mammals have two sets of limbs, which have adapted for special needs such as grasping, flying, swimming, and walking. Many mammals grow two sets of teeth. The first set, known as milk teeth, are actually pushed out by the permanent teeth.

Mammals come in all sizes, from tiny rodents to enormous elephants. Mammals also live in a variety of habitats with bodies that are adapted to meet many environmental conditions. Some aquatic mammals, such as the seal and the sea otter, have adapted to life in salt water, while others, such as beavers, make their homes in freshwater. Some mammals live in treetops where it is useful to possess grasping hands, feet, and tails. Still other mammals, such as prairie dogs, live in small villages underground.

Within the category of mammals, those that possess hooves make up a very large and diverse group. Hoofed mammals have teeth with broad surfaces that are used for grinding substances such as grass and other leaves. Hoofed mammals are classified into two orders according to the number of toes they possess. Animals in the order Perissodactyla have an uneven number of toes. Members of the order Artiodactyla, such as camels, possess an even number of toes. Although camels thrive in dry, hot environments, there are some mammals, such as polar bears and other members of the meat-eating order Carnivora, which flourish in colder climates. Other members of the order Carnivora include cats, both tame and wild.

The largest land animal in existence is the elephant, which is classified within the class Mammalia, order Proboscidea, because of its long and unusual nose. A widely recognized group of mammals are those within the order Primates. Monkeys, apes, and man are included in this category of animals. All primates are able to walk in an upright position. Among the larger mammals, *Homo sapiens* are undoubtedly the most successful and unique. The human population of the earth already exceeds 5 billion.

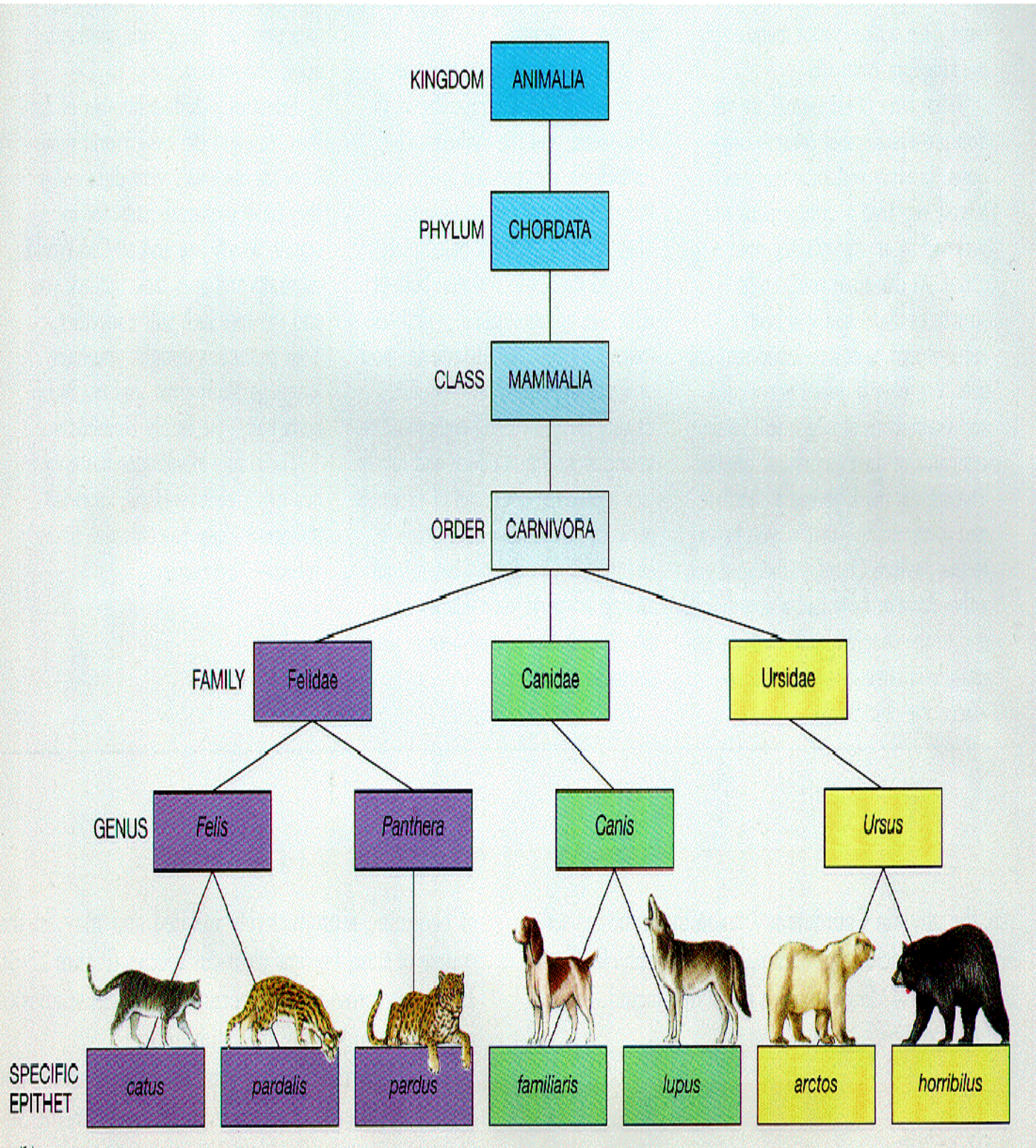
**Reptiles** - Members of the class Reptilia are regarded by scientists as more sophisticated than either fish or amphibians, but less sophisticated than either birds or mammals. Some of the more common members of the class Reptilia are turtles, snakes, and lizards.

A major characteristic of reptiles is that they have either an outer covering of scales or thick, leathery plates. All reptiles, whether they live on land or in water, breathe by means of well-developed lungs. Reptiles such as turtles, alligators, and certain snakes spend most of their lives in water. But even aquatic reptiles must come to the surface for an occasional breath of air. All modern reptiles are cold-blooded. Therefore, their body temperature changes with the temperature of the environment in which they live. Reptiles are sluggish in cold weather. They like to warm their bodies in the sunshine. In very hot climates, reptiles seek shade to keep from overheating. During cold winters, reptiles become inactive and hibernate. They emerge from their burrows only after the earth warms in springtime.

Since the time of the dinosaurs, the great majority of reptile species have become extinct. Only four of the nine original orders survive. These are lizards and snakes, turtles, crocodylians, and tuatara. Tuatara are lizard like reptiles that are native to New Zealand.

Among the reptiles that survive today, most are oviparous, which means that their young develop from eggs which are laid outside the mother's body. However, there are also certain snakes which are ovoviviparous, meaning that the mother's eggs hatch inside her body. These offspring are delivered alive. A few snakes are poisonous. Some, like rattlesnakes, have an unusual organ in their heads for detecting warmth. This gives them a special sensing ability when searching for warm-blooded animals, such as rodents. For this reason snakes are beneficial to farmers whose grain crops can be seriously damaged by rodents.

The largest reptiles of all, the dinosaurs, became extinct a very long time ago. Dinosaurs first appeared on the earth over 200 million years ago. They flourished during what is now known as the Age of Reptiles. Like the lizards of today, some dinosaurs, such as the *Tyrannosaurus rex*, survived by eating other animals, while some, like the *Brachiosaurus*, survived on plant life. There were also fishlike dinosaurs, and dinosaurs capable of flight. Numerous experts now believe that dinosaurs were probably warm-blooded animals like modern birds and mammals. However, they are still placed in the class Reptilia.



SPECIFIC  
EPITHET

# Animals

Without a backbone

With a backbone

Arthropoda



(a) Insecta



(b) Crustacea



(c) Arachnida



(d) Diplopoda

Mollusca



Fish



e.g.  
ray  
salmon  
guppy  
etc.

Amphibia



e.g.  
frog  
toad  
etc.

Reptiles



e.g.  
tortoise  
crocodile  
snake  
lizard  
etc.

Birds



e.g.  
gull  
penguin  
sparrow  
etc.

Mammals



e.g.  
whale  
elephant  
cat  
human  
etc.

Cold-blooded animals

Warm-blooded animals





**Kingdom Monera**



**Kingdom Protocista**



**Kingdom Fungi**



**Kingdom Plantae**



**Kingdom Animalia**

