Science Task

To explore the classification of animals and recognise the main groups of vertebrates.





A vertebrate is an animal with a spinal cord surrounded by cartilage or bone. The word comes from vertebrae, the bones that make up the spine. Animals that are not vertebrates are called invertebrates. Living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including animals. These groups include: fish, amphibians, reptiles, birds and mammals.

Your task is to create a leaflet as a classification chart for the different groups of vertebrates (fish, amphibians, reptiles, birds and mammals).

Make sure you include the key characteristics, examples and interesting facts. To the right, you can see an example of the reptiles section which shows you the minimum amount of information you need to include for each group.

You can use the notes on the pages given to find the key characteristics and then include as much detail as possible. You may even want to discuss the animals which don't follow the key characteristics such as the platypus: it is classed as a mammal even though it lays eggs instead of giving birth to live young.

Reptiles

Key Characteristics:

- Cold blooded animals
- Lay eggs
- Skin is covered with hard, dry scales


Examples of Reptiles:

- Alligators
- Crocodiles
- Snakes
- Lizards
- Turtles
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Interesting Fact:
Reptiles tend to be limited to tropical climates as they use the sun to fuel themselves, being cold-blooded. In captivity, heat lamps are used instead.

Fish

The first true vertebrates on Earth, fish evolved from invertebrate ancestors about 500 million years ago and have dominated the world's oceans, lakes, and rivers ever since. Today, there more than 30,000 species of fishes found in the fresh and salt waters of the world.

There are three main types of fish: bony fish, which includes such familiar species as tuna and salmon; cartilaginous fish, which includes sharks, rays, and skates; and jawless fish, a small family made up entirely of hagfish and lampreys).

Fish breathe under water using gills and are equipped with "lateral lines," interconnected networks of receptors along the head and body that detect water currents and even electricity.

Fish reproduction methods vary, but most fishes lay a large number of small eggs that are fertilised and scattered outside of the body. The eggs of pelagic (open ocean) fishes usually remain suspended in the open water, while many shore and freshwater fishes lay eggs on the bottom or among plants. The mortality of the young and especially of the eggs is very high, and often only a few individuals grow to maturity out of hundreds, thousands, and in some cases millions of eggs laid.

Amphibians

When the first amphibians evolved from their tetrapod ancestors 400 million years ago, they quickly became the dominant vertebrates on Earth. However, their reign wasn't destined to last; the frogs, toads, salamanders, and caecilians (legless amphibians) that make up this group have long since been surpassed by reptiles, birds, and mammals. Amphibians are characterised by their semi-aquatic lifestyles (they must stay near bodies of water to maintain the moisture of their skin and to lay eggs), and today they are among the most endangered animals in the world.

The name amphibian, derived from the Greek amphibious meaning "living a double life," reflects this dual life strategy—though some species are permanent land dwellers, while other species have a completely aquatic mode of existence.

There are three living groups of amphibians (caecilians, salamanders, and anurans [frogs and toads]) that, collectively, make up more than 7,300 amphibian species. One similar tendency among amphibians has been the evolution of direct development, in which the aquatic egg and free-swimming larval stages are eliminated. Development occurs fully within the egg capsule, and juveniles hatch as miniatures of the adult body form. Most species of lungless salamanders (family Plethodontidae), the largest salamander family, some caecilians, and many species of anurans have direct development. In addition, numerous caecilians and a few species of anurans and salamanders give birth to live young.

Frogs and toads display a wide variety of life histories. Some deposit eggs on vegetation above streams or ponds; upon hatching, the tadpoles drop into the water where they continue to develop throughout their larval stage. Some species create foam nests for their eggs in aquatic (watery), terrestrial (land-based), or arboreal (tree-based) habitats; after hatching, tadpoles usually develop in water. Other species deposit their eggs on land and transport them to water, while marsupial frogs are so called because they carry their eggs in a pouch on their backs. A few species lack a pouch and the tadpoles are exposed on the back; in some species, the female deposits her tadpoles in a pond as soon as they emerge from eggs.

Reptiles

Reptiles, like amphibians, make up a fairly small proportion of terrestrial animals, but as dinosaurs they ruled the Earth for over 150 million years. There are four basic types of reptiles: crocodiles and alligators; turtles and tortoises; snakes; and lizards. Reptiles are characterised by their cold-blooded metabolisms—they fuel themselves by exposure to the sun—their scaly skin, and their leathery eggs, which they, unlike amphibians, can lay some distance from bodies of water.

Reptiles are air-breathing vertebrates. They have internal fertilization, amniotic development (in which the embryo develops within a set of protective extra-embryonic membranes—the amnion, chorion, and allantois), and epidermal scales covering part or all of their body. The major groups of living reptiles—the turtles, tuataras, lizards and snakes, and crocodiles account for over 8,700 species.

While most reptiles feed on other organisms, a few are herbivorous (e.g., tortoises). As cold-blooded animals, reptiles tend to be limited to temperate and tropical areas, but, where they occur, they are relatively common; however, they are not as large or conspicuous as birds and mammals. Most reptiles are terrestrial, but a few are aquatic. They move about by creeping or swimming in a fashion similar to amphibians. Some reptiles, however, can lift the body from the ground and run rapidly either in a quadrupedal or bipedal fashion. Reptiles lay relatively large, shelled eggs. In a few instances, the eggs and young are cared for by the female; in others, the young are born alive.

Birds

Birds evolved from dinosaurs—not once, but probably multiple times—during the Mesozoic Era. Today they are by far the most prolific flying vertebrates, numbering 10,000 species across 30 separate orders. Birds are characterised by their coats of feathers, their warm-blooded metabolisms, their memorable songs (at least in certain species), and their ability to adapt to a wide range of habitats—witness the ostriches of the Australian plains and the penguins of the Antarctic coastline.

They are warm-blooded vertebrates, more related to reptiles than to mammals. They have a four-chambered heart (as do mammals), forelimbs modified into wings (a trait shared with bats), a hard-shelled egg, and keen vision. Their sense of smell is not highly developed, and their auditory range is limited.

Although most are capable of flight, others are sedentary, and some are flightless. In a manner similar to their relatively close relatives the reptiles, birds lay shelled eggs. The young are usually cared for in a nest until they are capable of flight and self-feeding, but some birds hatch in a well-developed state that allows them to begin feeding immediately or even take flight. (Nesting activities similar to those of some birds are seen in the crocodilians.)

Mammals

It's natural for people to consider mammals the pinnacle of evolution. After all, humans are mammals, and so were our ancestors. But in fact, mammals are among the least diverse animal groups: There are only about 5,000 species overall. Mammals are characterized by their hair or fur, which all species possess during some stage of their life cycles; the milk with which they suckle their young, and their warm-blooded metabolisms, which, as with birds, allows them to inhabit a wide range of habitats, ranging from deserts to oceans to arctic tundra.

Mammals differ from other vertebrate animals in that their young are nourished with milk from special mammary glands of the mother. Mammals are distinguished by several other unique features. Hair is a typical mammalian feature, although in many whales it has disappeared except in the fetal stage. The mammalian lower jaw is hinged directly to the skull, instead of through a separate bone (the quadrate) as in all other vertebrates. A chain of three tiny bones transmits sound waves across the middle ear. A muscular diaphragm separates the heart and the lungs from the abdominal cavity.

This group of vertebrates ranges in size from tiny shrews or small bats weighing only a few grams to the largest known animals, the whales. Most mammals are terrestrial, feeding on both animal and vegetable matter, but a few are partially aquatic or entirely so, as in the case of the whales or porpoises. Mammals move about in a great variety of ways: burrowing, bipedal or tetrapedal (four-legged) running, flying, or swimming. Reproduction usually involves the young developing inside the uterus, where nutritive materials are made available through an allantoic placenta or, in a few cases, a yolk sac. In marsupials, the relatively undeveloped young are carried in a pouch, where they attach themselves to their mother's nipple until they become fully developed. Monotreme mammals (that is, the platypus and echidna) differ from other mammals in that they lay eggs which hatch.