

MUSEUM OF NATURAL SCIENCES



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[http://artsandscience.usask.ca/
museumofnaturalsciences/](http://artsandscience.usask.ca/museumofnaturalsciences/)



WELCOME TO THE MUSEUM OF NATURAL SCIENCES

The Museum of Natural Sciences was made possible by the combined efforts of the Departments of Biology and Geological Sciences at the University of Saskatchewan. This Museum is designed to lead you through geological time, showcasing the theory of evolution by using live and static displays. To enhance this journey through earth's history, information panels will explain concepts in greater detail throughout the area.

IMPORTANT

Out of respect for the people, animals, plants, classes, offices and library in the area, PLEASE:

- Be QUIET
- Do NOT touch or tap any animal displays or tanks
- Do NOT touch plants
- Do NOT touch open water or fish
- Ensure SUPERVISION of children at all times



Waterfall Pond - Home of the Koi

AGE OF FISHES

The Devonian period (410 to 360 mya*) is known as the Age of Fishes. It was a time of great diversification of all groups of jawed fishes.



In the various tanks and ponds, it is possible to see representatives of some of Earth's diverse aquatic life.

Beginning with the invertebrate tank there are starfishes, anemones, hermit crabs, barnacles and sea cucumbers. This sea life is amazingly similar to what was present many millions of years ago.

In the cartilaginous fish tank one can see a representative of the family of fishes with very little bone. The sturgeons in this tank are similar to a species which can be found here in certain lakes and rivers of Saskatchewan.

In the tropical marine tank, there are representatives of bony fishes from the warm ocean waters from around the world. Often these representatives have specific behaviours and physiological modifications that assist in survival and reproduction, further enhancing the concept of natural selection.

The Amazon River tank has representatives from warm, fast moving rivers of the Amazon River basin. Often these species have aggressive and distinctive parental behaviours that ensure survival of the offspring to a more mature stage. This is another evolutionary adaptation.

The air-breathing fishes are unique in their physical adaptations that enable them to spend time out of water for extended periods, blurring the line between aquatic and land creatures. They are most definitely fishes, but ones which are capable of surviving environmental changes such as droughts. This showcases another evolutionary concept: adaptations that allow

survival of a species through a period of extreme conditions.

Further in the gallery are two ponds, one representing a large domesticated species derived from the common carp called koi. The central pond represents a species of ancient armored fish called a spotted gar. This fish can live in very low oxygen conditions due to an adapted air bladder which acts as a form of a lung. Fossil records show this species has survived unchanged in North American waters for 50 million years, and in the fossil record since the Cretaceous – over 110 mya*.

AGE OF AMPHIBIANS

The age of amphibians spans about 100 million years. It follows the first appearance of vertebrates on land which occurred about 370 million years ago. Towards the end of this age an increasing number of reptiles shared the land.



In the live display there are large North American bullfrogs. These frogs are not able to travel far from moist areas and require water to reproduce and grow their offspring (tadpoles). They are more mobile than fishes, but are still not able to move far away from water and explore the unclaimed land that existed in the Devonian period. Some amphibians share similar movement to that of a swimming fish, further enhancing the theory of evolution onto land from sea.

Located around the corner from the bullfrogs is a fiberglass replica of a very large amphibian that lived before the dinosaurs, some 270 mya. This replica of a Devonian amphibian, called *Eryops*, would appear much like a salamander does today.

*mya = million years ago

AGE OF REPTILES

According to most paleontologists, reptiles evolved from the large group of ancient amphibians known as Labrynthodonts, which received their names from the distinctive structure of their teeth.



The age of reptiles includes the Triassic, Jurassic, and Cretaceous periods (250 to 65 mya). Reptiles dominated the land and took to the sea and air. Dinosaurs are the most famous of the ancient reptiles. Our replicas represent three of the most well known examples.



Triceratops was a large herbivorous dinosaur, which attained a length of 9 meters and weighed 8 tons. The elaborate frill on the neck served as a defence, a display for mate attraction and possible thermoregulation.

Tyrannosaurus rex is probably the dinosaur about which most people know. This was one of the largest carnivores to ever live, achieving a height of 6 meters and length of 15 meters. The long tail was used for balance. Studies of animals alive today would allow that *T. Rex* was both scavenger and hunter.



The *Mosasaur* was a swimming reptile which was theorized to have been a top predator of the prehistoric ocean. At the peak of its existence a vast inland sea covered much of North America.

Also found in the museum is *Stegosaurus*. This 6 meter long dinosaur had large plates on its back that were not attached to the skeleton of the reptile at all. It is theorized that the plates may have had two functions: to provide protection and for use in thermoregulation.



Snakes have evolved very little throughout geological time. There is not much evidence in the fossil record due to the nature of the fragile bones of a snake, but what is available indicates they have been around in their current form at least 130 million years.



Our birds represent one type of reptile evolution. The bird-hipped dinosaurs are theorized to have evolved ever-lighter bones, and developed feathers to enable sustained flight. This is characteristic to most birds. Flightless birds still retain physiological characteristics of those that fly, but have the adaptations to swim or walk at great speed in exchange for flying ability.



AGE OF MAMMALS

The age of mammals arose following extinction of the dinosaurs at the end of the age of reptiles, 65 mya. We live in the age of mammals. Mammals today are the principal land-dwelling vertebrates, although some, such as dolphins and whales, live in the sea.

A major display in the Museum features the evolution of the horse. There are five replicas of the modern horse's ancestors, representing how the horse has changed over time. These characteristics include the reduction of the number of toes from 4 to 1 over time, the increase in the overall size of the animal, and the adapted crowning and ridging of the teeth. These changes allowed the movement from the forests to the plains which bore tougher grasses for food. The earliest known member of this group is *Hyracotherium*, a forest-dwelling animal. It lived over 55 mya.

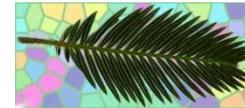


Mammals share several characteristics, such as milk-producing mammary glands to feed the offspring, warm-blooded homeothermic regulation, and hair or fur (or vestiges of the structures that make them). Mammals are able to exploit niches in the environment that could not support cold-blooded reptiles or amphibians.

Our live mammal representatives are degus (pronounced day-goo). They are small rodent-like mammals native to Chile. They do not fit cleanly into any taxonomic order and are considered by many to be lagomorphs, (like hares) rather than rodents (like rats).

AGE OF PLANTS

Although the focus so far has been on the evolution of animals, take a few moments to consider the evolution of plants (and insects, though we do not show representatives in this Museum). The evolution of animals was very dependent upon these plants. The first plants appeared on land well before the earliest amphibians, more than 400 mya. All living land plants, including mosses and liverworts, evolved from green algae.



Early land plants were very small, probably confined to low, wet habitats. During the Age of Fishes, plants underwent great diversification as the atmosphere changed. At the end of the Devonian period, the first great forest ecosystems existed, and into these ancient forests crawled the first amphibians.

During the Age of Amphibians, coal generating forests of giant club mosses and horsetails covered much of the land. Ferns and fern-like plants were abundant. This period, the Carboniferous, is known as the COAL AGE. Near *Eryops* are representatives of early land plants, very much still dependent on water for reproduction and growth.

Near the four story windows are the many archaic seed plants. These represent vegetation

alive during the Age of Reptiles. It was also known as the Age of Conifers and Cycads.

Both the conifers and cycads are seed plants, unlike the spore-producing ferns, club mosses and horsetails. The seeds allow exploitation of habitats that are not flooded. The Museum's tallest tree is the conifer *Araucaria heterophylla*. Conifers remain a significant part of world vegetation even today, and are the basis for Canada's forest industry.

Angiosperms, the flowering plants, are the most recently evolved group of plants. They appeared during the Age of Reptiles, and now dominate most land environments. The tremendous diversity of angiosperms is scarcely represented from the waterfall to the Equus display. Angiosperms provide a significant amount of food energy for nearly all land vertebrates, including humans.

GEOLOGY FIRST FLOOR



EARTH SCIENCES: the displays and information panels along the ground floor hallway of the Geology Building illustrate minerals, rocks, and meteorites. Displays explain the causes and effects of earth events such as plate tectonics, earthquakes, volcanoes and tsunamis. A seismographic monitor shows quake activity from around the globe.

GEOLOGY SECOND FLOOR

FOSSIL RECORD: The second floor demonstrates earth's biological beginnings, throughout evolution from the ancient seas and mud up to the ice age mammals and early hominids. Static displays inform and examples show the fascinating processes that shaped our existence.

