

WALKING GUIDE

NATURAL SCIENCES MUSEUM AND GEOLOGY MUSEUM

This tour may be done in groups or as individuals. We ask that all groups be adequately supervised and that nearby classes, library and offices be respected by keeping noise levels low. Please use stairs, not the elevators, when touring the building. Self-guided group tours are asked to book a time to prevent too many groups from being in the museum at once. Tour bookings and feedback can be directed to the Department of Biology at 966-4399. Enjoy your tour!

IMPORTANT: ANIMAL AND PLANT EXHIBITS ARE ALL ALIVE. DO NOT TOUCH OR TAP TANKS OR GLASS DISPLAY FRONTS. ANIMALS ARE SENSITIVE TO EXCESS NOISE AND VIBRATION AND THIS WILL NOT BE TOLERATED. PLANTS SHOULD NOT BE HANDLED. DINOSAUR AND OTHER REPLICAS ARE ALSO FRAGILE AND SHOULD NOT BE TOUCHED OR HANDLED.

MAIN FLOOR MUSEUM LEVEL

Age of Fishes (Devonian Period, mid Paleozoic Era)

Begin your tour at the fish tanks located opposite central stairwell to the second floor. The series of tanks exhibit the evolution of sea life through to air-breathing fishes. The invertebrate and marine tanks are salt water (ocean life) and are particularly worth a few minutes to observe and to learn about the often colourful species exhibited. A moveable stand is available for smaller visitors to view.

On the north wall next to the tanks is a display panel on the evolution of fishes. Many of the fishes in the tanks belong to a group known as the 'bony fishes'. Their ancestors date back to the Devonian geological period, a time when the fishes were the dominant form of life on earth.

Move to the time scale located to the left (south) side of central stairwell. This gives an overview of the museum, the route you should follow through the live displays, and the geological time scale around which the displays are organized.

Age of Amphibians (Carboniferous Period, late Paleozoic Era)

The amphibian display to your left contains frogs (*Rana catesbiana*, the American bullfrog). Note the color differences representing health and vitality, with the strongest colors being the most healthy and aggressive frogs.

Check the display board to the left of the frogs to discover when their ancestors evolved - **in which geological time period and how many million years ago?** **Carboniferous and early Permian - 400 mya**

Move around the display panel to observe the *Eryops* skeleton representing a very large animal in the evolutionary history of the amphibians. **Imagine how large the insects would have been to feed this salamander!**

Across from the *Eryops* is a flip chart of some of the ferns planted in the museum. **Try to identify some through your tour, listing them in the space below.**

Latin names - Psilotum; Selaginella; Asplenidium; Cyrtomium; Pteris

Common names - Holly Fern; Button fern; Rabbits foots fern; table fern; Maiden hair fern

Age of Reptiles (also called Age of the Dinosaurs, Mesozoic Era)

The display board to the left of *Eryops* shows that the turtles, crocodiles, snakes and lizards are reptiles that have survived to this day. Their ancestors were dominant in the Mesozoic Era - **how many million years ago?**
200mya

Move left to the display of the Stegosaurus. The dinosaurs are often thought to be the most impressive group of reptiles because of the considerable size that some of their species attained. You will see other examples later in the tour. They became extinct 65 million years ago at the end of the Cretaceous Period and Mesozoic Era.

Opposite the Stegosaurus skeleton is a live reptile display. The black rat snake lives in this enclosure. **What do you think it eats?** **rats and mice**

During the previous Palaeozoic era, life moved from oceans to land. **What are two features that evolved which allowed animals independence from water?** Check the reptile display boards again if in doubt.

a. **eggs with shells - resist water loss**

b. **waterproof skin**

Terrestrial (land-dwelling) plants evolved water conducting cells (vascular tissue) and waxy cuticles on their surfaces to resist desiccation (drying). A model for these early plants is the still living *Psilotum*, a leafless plant growing to the left of the reptile display. **Sketch this simple, spore-bearing plant. (Use back of page) should look like a bare tree branch**

Continue the tour past the lizards and view the panel "Evolution of Plants". Conifers (cone bearing plants) were the dominant plant group in the Mesozoic era. Notice examples of conifer diversity such as Norfolk pine, monkey puzzle tree, and cycads. The soft leaves of some of the conifer trees, plus ferns, were probably the basis of the herbivorous dinosaur diet. Continue moving forward to the display panel on birds, a group now considered to have evolved from small dinosaurs. There is also a display of live birds.

The pond area represents a change from coniferous and spore-bearing plants to the flowering plants. A panel under the plant canopy slightly past the central pond explains the changes this brought to the evolution of mammals.

Age of Mammals (Cenozoic Era)

Flowering plants, the angiosperms, became dominant by the Cenozoic era. Changes in climate resulted in shifts of vegetation type, which affected animal evolution. The evolution of the horse is used as an example of mammalian evolution. **List the five horses on exhibit at the back of the plant displays, noting an important evolutionary change for each one.**

a. **hyracotherium - low crowned teeth; 4 or 5 toes**

b. **mesohippus - middle toe enlarged - other two still present**

c. **merychippus - teeth changes, "cannon bone" enlarged (this is actually incorrect on the display - it should be the metatarsal bones)**

d. *dinohippus* - one toe; high crowned teeth

e. *equus* - high crowned enamelled teeth and enlarged foot/toe

Behind you, against the central pond by the head of the *Stegosaurus*, is a display panel on the evolution of the dinosaurs. **What does the word "dinosaur" mean?**

"Terrible Lizard"

Study this panel carefully before proceeding to the *Tyrannosaurus* and *Triceratops* replicas around the stairwell at the south entrance to the museum (the exit to the campus bowl). These represent the two lineages of dinosaur evolution: *Ornithischia* (meaning bird-like) and *Saurischia* (meaning reptile-like). As the display panel explains, the main diagnostic feature between the two groups is the arrangement of the pelvic bones, *Triceratops* being similar to the present day birds and *Tyrannosaurus* to the modern reptiles.

Was the *Tyrannosaurus rex* a native species in Saskatchewan during the Mesozoic era? Yes (Cretaceous pd)

Note the difference in the pelvic structure between *Tyrannosaurus* and *Triceratops*. The skull beneath the head of *Triceratops* represents one of the duckbilled dinosaurs.

TO BEGIN YOUR TOUR OF THE GEOLOGICAL EXHIBITS TAKE THE STAIRS TO THE SECOND FLOOR (in the Geology wing past *Triceratops*)

In the stairwell is a series of prints titled "The Land Before Us" about life in the different geological eras. The one subtitled "The Late Palaeozoic" mentions a reef- building animal that formed the basis of our oil-bearing rocks.

Name the animal. *stromatoporids*

Turn right as you leave the stairwell and tour the second floor counter-clockwise, first stopping to view the flying reptile *Pteranodon*. Notice the hanging murals, over the central area of the first floor, which represent some of the main taxonomic groups of life: fish, amphibians, reptiles, mammals, and plants. **What animal represents the mammals?** *fox*

The brightly colored tile murals on the stone wall of the Biology Department facing you represent the phases of cell division (mitosis). This wall was originally the outside wall of the Biology building before the Museum and Geology buildings were constructed.

On the wall facing the open museum area the panels begin. The one titled "Earth History: Geological Time" explains the geological time scale that Earth's evolution is based on.

Write down the time periods: (listed here in no particular order)

Cretaceous

Ordovician

Silurian

Devonian

Carboniferous

Permian

Tertiary

Jurassic

Triassic

Cambrian

Through the doors and around the corner is a display entitled "The Birth of a Planet". The display case contains fossils representing the evolution of life. Stromatolites are our oldest record of life. **What created these fossils?** *Cyanobacteria and bacteria forming calcite layers much like modern reef-building corals.*

The slate wall opposite has many fossils outlined -**find some of them.**
(Not named) - Visual display

In the next two display cases are fossils of *Archaeopteris* and *Archaeopteryx*. **Write down what these are in one or two words:**

- a. *Archaeopteris* - *considered the first true tree in the fossil record*
- b. *Archaeopteryx* - *a flying feathered reptile/bird evolutionary creature*

Between these two cases is a large cast of a **sea-lily**. As explained in the previous display case, these organisms were abundant in the Early Carboniferous. **Sketch it.** (use back of page) *Should look like a feathered flower on a long stalk*

In the "Vertebrates on Land" display case, **three features** of both lobe-finned fish and amphibians are due to evolution from a common ancestor. **List them here.**

- a. *analogous skull bones*
- b. *tooth composition*
- c. *analogous limb bones*

Around the corner is information about early mammals. **What large mammal lived in Saskatchewan during the Oligocene era?** *Titanothera*

In the second last display cabinet "Emergence of Modern Flora", there are several plant fossils. **What ecosystem covered much of Western Canada in the Early Tertiary era?** *Coal swamp forest with cypress trees and redwood trees*

What three mammoth parts are displayed in the last case at the end of the hall? *tooth, tusk, thigh bone*

Continue forward around the second floor hallway (these are offices, please keep noise level low), which displays geological maps of the world. On the section "Bedrock Geology of the World", find the age of the oldest ocean floor rocks. **Write the name of the time periods when these rocks were formed** (hint: use the colored time scale at the bottom of the map) *Precambrian*

Where do most of these rocks occur in relationship to the continents? *They are on the edges of the continents*

At the end of the hall is a geological map of Saskatchewan: **Make a simple sketch of Saskatchewan**, (use back of page) including the boundary between the northern Precambrian exposure and southern Phanerozoic sediments. *Looks like rectangle with upper central portion divided from an upper left to lower right angle - lots of serpentine lines within this division*

GO UP THE STAIRS TO THE THIRD FLOOR

Turn right to see a great view of *Tyrannosaurus rex* and the flying reptiles.

Turn back and go down the hall where there is a series of paintings depicting the evolution of life over the periods of the time scale.

In the "Silurian Sea", what are 2 types of trilobite?

Smooth - *Aulacopleura*

Spiny - *Cheirurus*

Moving along, notice the casts on the right wall; name these three swimming reptiles.

a. *Ichthyosaur*

b. *Plesiosaur*

c. *Mystriosaurus* (marine crocodile)

In the last painting, what animal are the Late Palaeolithic Hunters butchering? *Megaceros*

AT THE END OF THE HALL ARE STAIRS LEADING BACK DOWN TO THE FIRST FLOOR.

Proceed down the hallway forward/left and find the display on volcanoes. What is the name of the floating rock?
Pumice

In the Plate Tectonics display, find and record the name of the super-continent. *Pangaea*

Tour the mineral and rock displays. Give one example of a:

Clastic sedimentary rock _____ any of conglomerate, shale, sandstone, limestone

Non-clastic sedimentary rock _____; any of halite, potash, gypsum, limestone

On the left are cabinets of mineral crystals.

What is the chemical formula for gypsum?

CaSO₄2H₂O

Name one rock or mineral you like and explain why.

Open to any answer...too many to list

What class of minerals makes up 95% of the crust and mantle? Name two minerals from this group.

Silicates/ - any 2 of feldspar, quartz, hydrous silicates, olivine, pyroxene

Around the corner, the last display by the elevator is titled AResources of Saskatchewan@. It names four important (economic) natural resources in Saskatchewan. List them:

a. *potash*

b. *coal*

c. *petroleum*

d. uranium