

Canada's Geologic History

Geologic Time:

- ? The Earth is estimated to be around 4,600,000,000 years old. How can we even begin to organize this vast lifespan in order to better study it?
- ? In order to better understand the Earth's history, geologists have divided it into four time periods called **eras**.
 - o Cenozoic, Mesozoic, Paleozoic and Precambrian

- ? Precambrian Era:
 - o The Precambrian Era began when the Earth was first formed, 4,600,000,000 years ago. This era lasted for about 4 billion years, approximately 87% of the Earth's history.
 - o During this era, the only existing part of Canada was the Canadian Shield, which was formed as a result of sedimentation from the ancient seas, which existed over Canada. This sediment, through processes of compression was formed into rock. This sedimentary rock gradually was pressed into metamorphic rock. In addition, rising magma from the mantle cooled and contributed to the formation of the Shield. This explains why the Shield is made up of a variety of types of rocks.
 - o The Shield was gradually worn down by erosion (wearing down from wind, rain, running water, or ice)
 - o Fossils found in the Canadian Shield date back to the middle of the Precambrian Era, when only single-celled organisms (Algae) existed. By the end of the era, more complex organisms had developed.

- ? Paleozoic Era:
 - o The Paleozoic Era lasted 325 million years, and continued to shape Canada's landforms.
 - o Scientists speculate that Canada was located near the equator during the early Paleozoic era, over 400 million years ago.
 - o Shallow seas existed around the Canadian Shield, and swamps grew in the tropical climate. Fossil fuels were created by this warm climate.
 - o About 300 million years ago, the continents collided together to form Pangaea, the supercontinent.
 - o As a result of plates colliding with the Canadian Shield, the land was crumpled up and formed the Appalachian mountains, on the Eastern coast.
 - o Living organisms existed only in the seas at the beginning of the era, however as the period progressed, plants and animals developed on land. Amphibians were the first animals to live on land.

? Mesozoic Era

- This era lasted about 180 million years, and saw the beginning of the breaking up of Pangaea. Canada's central and western regions were covered by swamps and seas at various times during this period.
- The Rocky Mountains began to form by the collision of the North American plate with the Pacific plate. Similarly, the Innuitian Mountains were formed in the eastern Arctic by moving plates.
- Canada's climate was still warm during this era, and Dinosaurs and other reptiles roamed through its swamps and forests. Fossilized evidence of these giant lizards can be found in the layers of sandstone in Red Deer River, Alberta. Dinosaur Provincial Park now exists there to protect the 75 million year old fossils.
- Coal was also formed in this period by sediment deposition, fossilized animal remains, and tremendous pressure.
- At the end of the Mesozoic Era, a mass extinction took place, in which more than half of all plant and animal species, including the Dinosaurs, were wiped out. There are a variety of theories as to why this occurred (asteroid collision, etc)

? Cenozoic Era

- Forces continued to shape the Rockies and Coast mountain ranges, and the seas disappeared from the inland of Canada.
- In the last 2 million years, the world experienced an Ice Age, in which huge masses of ice, or Glaciers, developed as a result of slight cooling of the climate.
- The movement of these glaciers was very important. Their immense weight caused them to scrape along the earth, transporting material and shaping the landscape significantly. They rounded the tops of certain mountain ranges and continued to erode the Canadian Shield. They were also responsible for carving the many lakes that are found in Canada today.
- The last ice age ended for most of Canada as recently as 6,000 years ago, but glaciers are still found in some mountains and Arctic areas.
- The Cenozoic era is the age of mammals. Mammals including humans become dominant in the period.
- Despite the short time span that we have been on Earth, we have had a tremendous effect on the landscape of the Earth (e.g., dams, deforestation, air and water pollution, industrialization, ozone layer depletion). However, in comparison to the tremendous power of geologic forces, our changes have been minor.

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